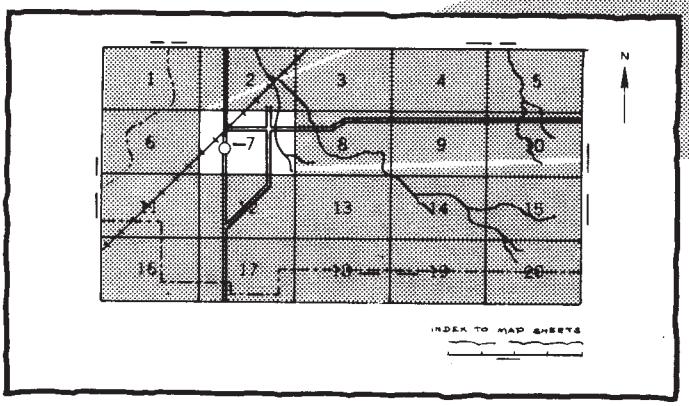
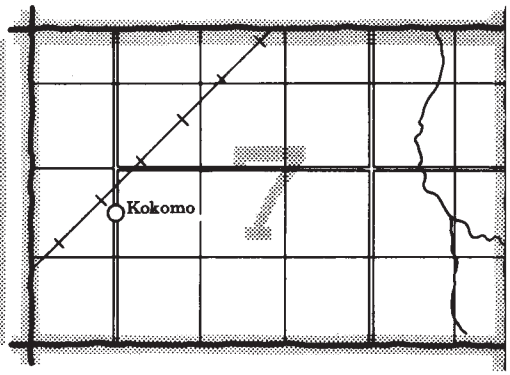
soil survey of Lee County, Alabama

United States Department of Agriculture, Soil Conservation Service
in cooperation with
Alabama Agricultural Experiment Station and
Alabama Department of Agriculture and Industries

HOW TO USE

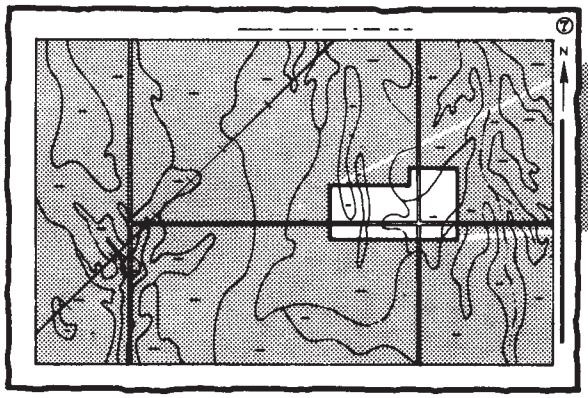
1. Locate your area of interest on the "Index to Map Sheets" (the last page of this publication).

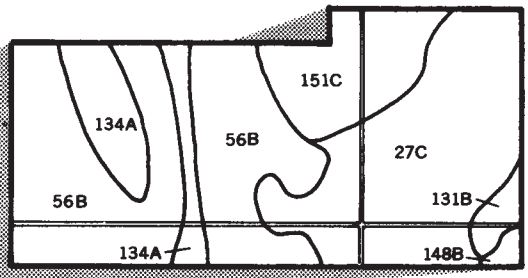




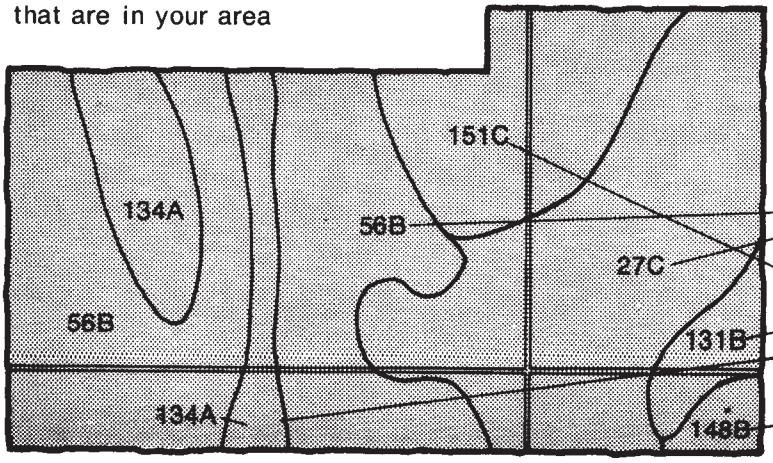
2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.





4. List the map unit symbols that are in your area

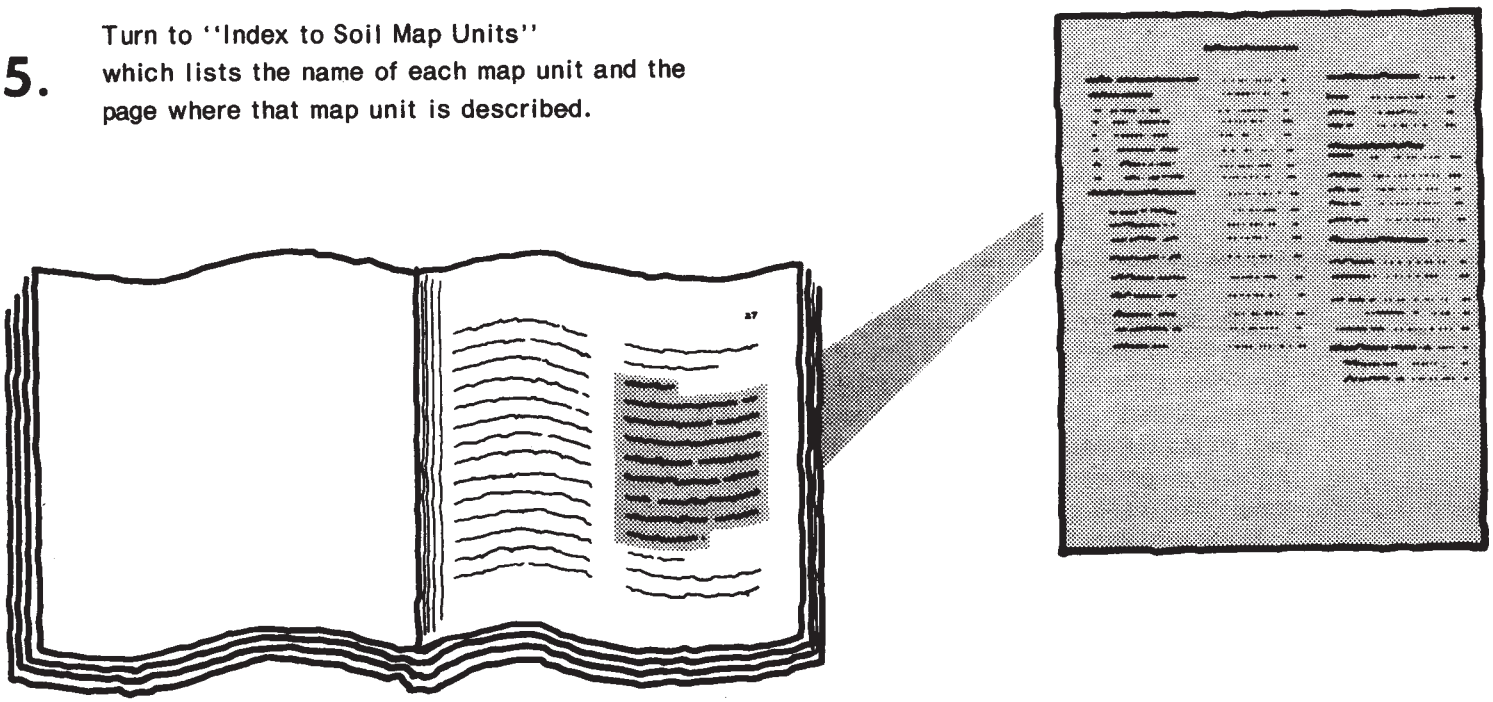


Symbols

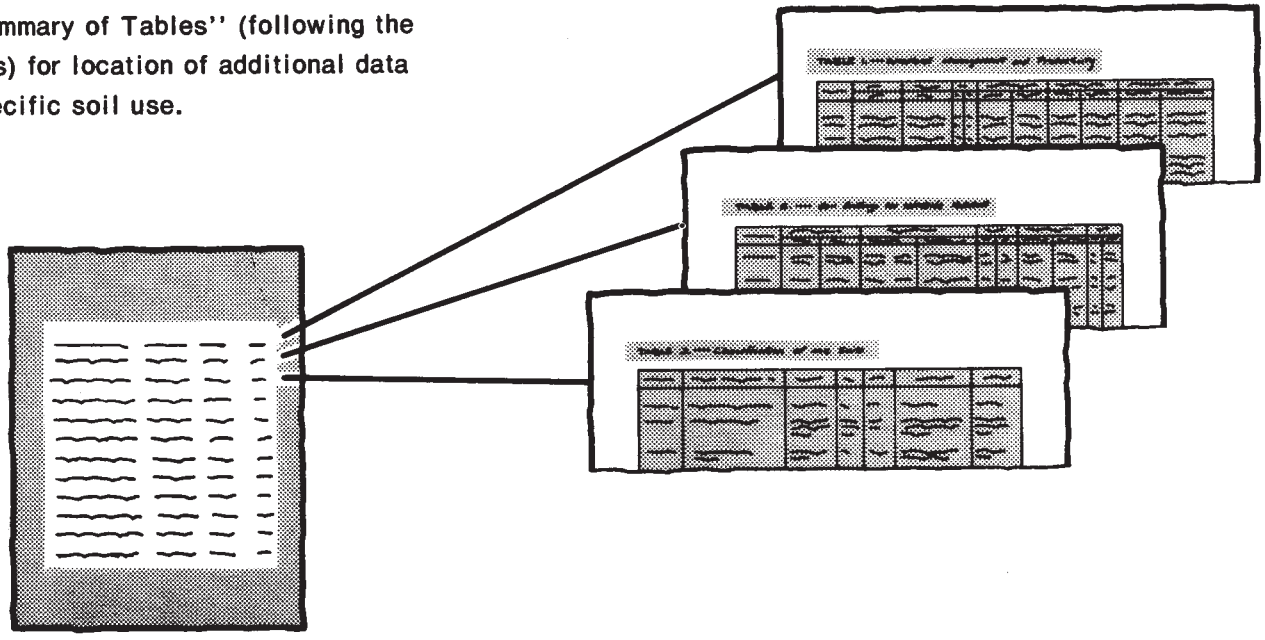
27C
56B
131B
134A
148B
151C

THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; for specialists in wildlife management, waste disposal, or pollution control.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was performed in the period 1973-78. Soil names and descriptions were approved in 1978. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1978. This survey was made cooperatively by the Soil Conservation Service, the Alabama Agricultural Experiment Station, and the Alabama Department of Agriculture and Industries. It is part of the technical assistance furnished to the Lee County Soil and Water Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

Cover: Loblolly pine in an area of Cecil sandy loam, 1 to 6 percent slopes.

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soil series

Issued April 1981

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foreword

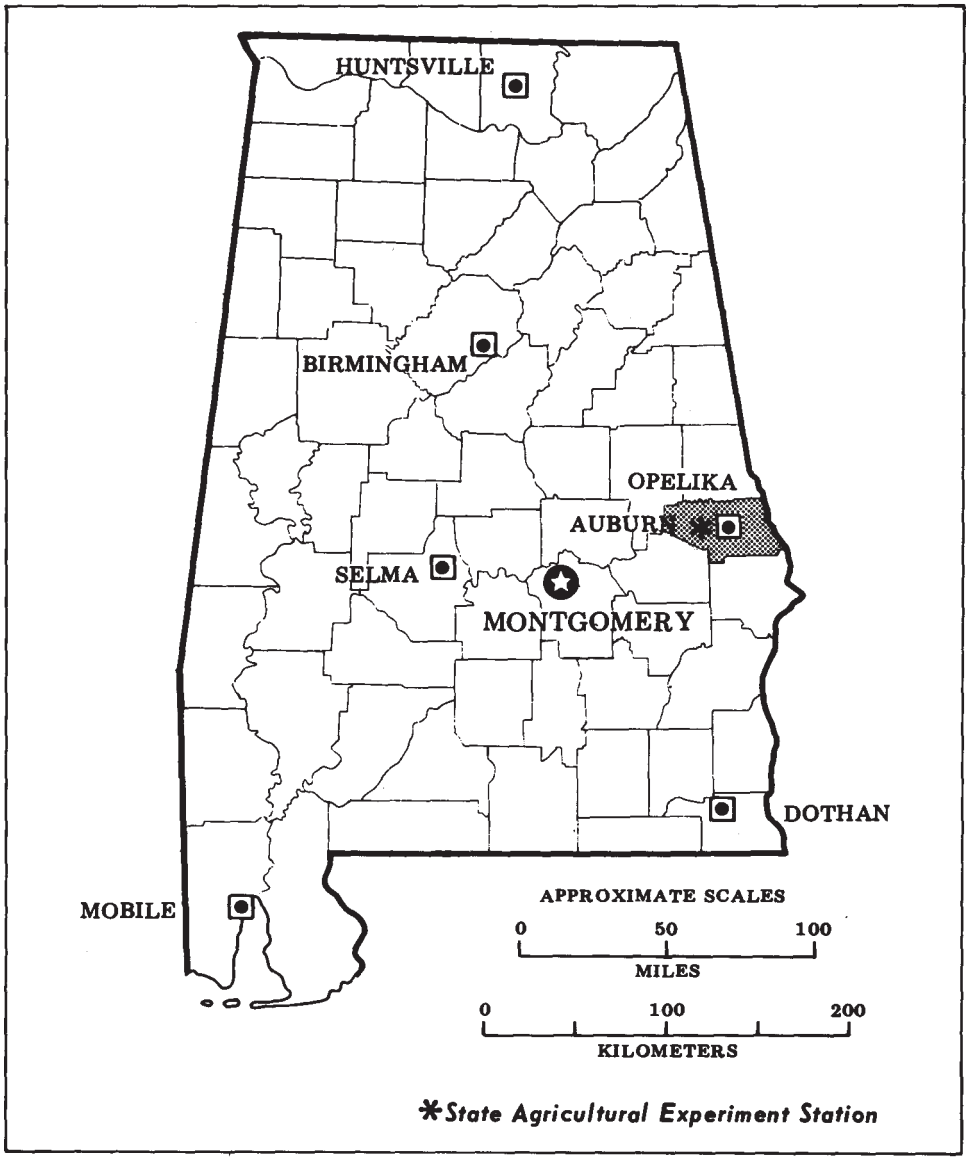
This soil survey contains information that can be used in land-planning programs in Lee County, Alabama. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

W. B. Lingle
State Conservationist
Soil Conservation Service



Location of Lee County in Alabama.

soil survey of
Lee County, Alabama

By Robert B. McNutt, Soil Conservation Service

Soils surveyed by Robert B. McNutt and Milton Tuck,
Soil Conservation Service
Ray A. Hoyum, Alabama Agricultural Experiment Station,
assisted in field mapping

United States Department of Agriculture, Soil Conservation Service,
in cooperation with the Alabama Agricultural Experiment Station
and the Alabama Department of Agriculture and Industries

Lee County is east and slightly south of the center of Alabama. The Chattahoochee River runs along the eastern boundary between Alabama and Georgia. In 1970, the population of the county was 61,268. Opelika, the county seat, had a population of 19,027. The county has a total area of 395,520 acres, or 618 square miles.

The county is in two land resource areas. The northern part is mainly in the Southern Piedmont Land Resource Area, and the southern part is mainly in the Southern Coastal Plain Land Resource Area.

In the Piedmont, uplands are mostly broad, nearly level to strongly sloping, and bottom lands are long, narrow, and nearly level. The Coastal Plain is nearly level to strongly sloping; some of the side slopes are moderately steep. Elevation ranges from about 300 feet, in the southern part of the county, to about 850 feet, in the northern part. The Piedmont is generally 100 to 200 feet higher than the Coastal Plain.

Lee County was organized in 1866 and was named in honor of General Robert E. Lee. Many of the early settlers in the county came from North Carolina, South Carolina, and Georgia.

The county is served by three railroads, US Highways 80, 29, 280, and 431, Interstate 85, and numerous state and county roads.

A soil survey of Lee County was published in 1950 (*9*). This survey updates the earlier one and provides additional information and larger maps on a photographic base.

general nature of the survey area

In the paragraphs that follow, the natural resources, farming, and climate of Lee County are briefly described.

natural resources

Soil is the most important natural resource in the county. Water is plentiful. Reservoirs furnish nearly all of the water for municipal and domestic purposes. Lake Harding, Goat Rock Lake, the Chattahoochee River, and many creeks furnish water for industry, farms, and recreation. There are numerous farm ponds throughout the county.

One large area near Chewacla State Park is mined for agricultural lime and for construction rock.

farming

The first settlers in Lee County produced mainly food crops, such as corn, oats, potatoes, wheat, vegetables, and rice. Some tobacco was also grown. Cotton, however, soon became the principal cash crop. A few livestock were pastured in the Piedmont. The early farmers used no commercial fertilizer; they moved to new lands when crop yields dwindled. Most of the county was originally woodland consisting of mixed pine and hardwoods. Much of the timber was destroyed as the land was cleared for cultivation.

In the early 1900's, insects, erosion on the clayey soils, and acreage controls significantly decreased the

amount of cotton grown in the Piedmont. Pasture and hayland replaced the cotton, and raising beef cattle and dairying became the chief sources of farm income.

During the 1960's, soybeans became one of the major cash crops in the county. At present the other main sources of farm income are wood products, beef cattle, corn, and cotton.

climate

Prepared by the National Climatic Center, Asheville, North Carolina.

Lee County has long, hot summers because moist tropical air from the Gulf of Mexico persistently covers the area. Winters are cool and fairly short. A rare cold wave lingers for 1 or 2 days. Precipitation is fairly heavy throughout the year. Prolonged droughts are rare. Summer precipitation, mainly afternoon thundershowers, is usually adequate for all crops.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Opelika, Alabama, in the period 1951 to 1977. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 45 degrees F, and the average daily minimum temperature is 32 degrees. The lowest temperature on record, which occurred at Opelika on January 25, 1963, is 1 degree. In summer the average temperature is 77 degrees, and the average daily maximum temperature is 89 degrees. The highest recorded temperature, which occurred on July 8, 1977, is 102 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 58 inches. Of this, 28 inches, or about 50 percent, usually falls in April through September, which includes the growing season for most crops. In 2 years out of 10, the rainfall in April through September is less than 23 inches. The heaviest 1-day rainfall during the period of record was 6.8 inches at Opelika on October 1, 1965. Thunderstorms occur on about 70 days each year, and most occur in summer.

Average seasonal snowfall is 1 inch. The greatest snow depth at any one time during the period of record was 9 inches. Days on which there is at least 1 inch of snow on the ground are rare, but the number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 50 percent. Humidity is higher at night, and the average at dawn is about 90 percent. The sun shines 65 percent of the time possible in summer and 50 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 8 miles per hour, in winter.

Severe local storms, including tornadoes, strike occasionally in or near the area. Such storms are short and cause variable and spotty damage. Every few years, in summer or autumn, a tropical depression or the remnant of a hurricane which has moved inland causes extremely heavy rain for 1 to 3 days.

how this survey was made

Soil scientists made this survey to learn what soils are in the survey area, where they are, and how they can be used. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; the kinds of native plants or crops; and the kinds of rock. They dug many holes to study soil profiles. A profile is the sequence of natural layers, or horizons, in a soil. It extends from the surface down into the parent material, which has been changed very little by leaching or by plant roots.

The soil scientists recorded the characteristics of the profiles they studied and compared those profiles with others in nearby counties and in more distant places. They classified and named the soils according to nationwide uniform procedures. They drew the boundaries of the soils on aerial photographs. These photographs show trees, buildings, fields, roads, and other details that help in drawing boundaries accurately. The soil maps at the back of this publication were prepared from aerial photographs.

The areas shown on a soil map are called map units. Most map units are made up of one kind of soil. Some are made up of two or more kinds. The map units in this survey area are described under "General soil map units" and "Detailed soil map units."

While a soil survey is in progress, samples of some soils are taken for laboratory measurements and for engineering tests. All soils are field tested to determine their characteristics. Interpretations of those characteristics may be modified during the survey. Data are assembled from other sources, such as test results, records, field experience, and state and local specialists. For example, data on crop yields under defined management are assembled from farm records and from field or plot experiments on the same kinds of soil.

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized so that it can be used by farmers, woodland managers, engineers, planners, developers and builders, home buyers, and others.

general soil map units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, a map unit consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in other units but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

The soils in the survey area vary widely in their potential for major land uses. Table 4 shows the extent of the map units shown on the general soil map. It lists the potential of each, in relation to that of the other map units, for major land uses and shows soil properties that limit use. Soil potential ratings are based on the practices commonly used in the survey area to overcome soil limitations. These ratings reflect the ease of overcoming the limitations. They also reflect the problems that will persist even if such practices are used.

Each map unit is rated for *cultivated crops, woodland, urban uses,* and *recreation areas*. Cultivated crops are those grown extensively in the survey area. Woodland refers to areas of native or introduced trees. Urban uses include residential, commercial, and industrial developments. Intensive recreation areas are campsites, picnic areas, ballfields, and other areas that are subject to heavy foot traffic. Extensive recreation areas are those used for nature study and as wilderness.

soil descriptions

1. Pacolet-Cecil

Moderately deep and deep, well drained soils that have a loamy surface layer and a dominantly clayey subsoil; formed in residuum of granite, gneiss, and schist of the Piedmont Plateau

These soils are gently sloping to steep. They are well drained and are on broad plateaus in the central and northern parts of the county.

This map unit makes up about 59 percent of the county. About 47 percent of the unit is Pacolet soils, and about 33 percent is Cecil soils. The rest is soils of minor extent.

Pacolet soils are on the more rolling landscape in the northern part of the county. Cecil soils generally are on the broad, more gently sloping to sloping landscape in the central part.

The minor soils in this unit include the well drained Appling, Durham, and Toccoa soils, the well drained to excessively drained Louisburg soils, and the somewhat poorly drained Cartecay soils.

Pacolet-Cecil soils are used mainly as woodland. Open areas are used for pasture. The soils have good potential for these uses. They also have good potential for use as habitat for woodland and openland wildlife.

Much of the acreage was once cleared and cultivated. In most areas these soils have fair potential for cultivated crops, provided conservation practices are followed. Erosion and slope are the main limitations to use of the soils as cropland. The small size and irregular shape of fields also affect the suitability of the soils for farming.

These soils have fair potential for urban uses. The clayey subsoil and the moderate permeability are the main limitations.

2. Marvyn-Cowarts-Uchee

Deep, well drained and moderately well drained soils that have a sandy surface layer and a loamy and clayey subsoil; formed in marine sediment of the Coastal Plain

These soils are gently sloping to strongly sloping. They are on broad ridgetops and side slopes in the central and southern parts of the county.

This map unit makes up about 22 percent of the county. About 36 percent of the unit is Marvyn soils, 19 percent is Cowarts soils, and 11 percent is Uchee soils. The rest is soils of minor extent.

Marvyn soils generally are on the smoother ridgetops. Cowarts and Uchee soils generally are on the more rolling landscape.

The minor soils in this unit are the well drained Orangeburg soils, the poorly drained Kinston soils, and the moderately well drained Sacul soils.

The soils in this map unit are used mainly for cultivated crops and pasture. Most of the acreage has been cleared. The soils have good to fair potential for cultivated row crops and for pasture and hay crops. Erosion is the main limitation to use of the soils as cropland.

These soils have good potential for use as habitat for openland and woodland wildlife and good potential for woodland use. They have fair potential for most urban uses. Permeability is moderate to moderately slow. The Cowarts and Uchee soils have a perched water table late in winter and early in spring.

3. Gwinnett-Hiwassee

Moderately deep and deep, well drained soils that have a loamy surface layer and a dominantly clayey subsoil; formed in residuum of hornblende, gneiss, and schist of the Piedmont Plateau

These soils are gently sloping to strongly sloping. They are on broad plateaus in the northern part of the county.

This map unit makes up about 10 percent of the county. About 49 percent of the unit is Gwinnett soils, and 28 percent is Hiwassee soils. The rest is soils of minor extent.

Gwinnett soils generally are on the more undulating landscape. Hiwassee soils are generally on the smoother, less sloping landscape.

The minor soils in this unit include the well drained Cecil and Pacolet soils and the somewhat poorly drained Cartecay soils.

The soils in this map unit are used mainly for pasture and as woodland. They have good potential for these uses. These soils have fair potential for cultivated row crops and good potential for pasture and hay crops. Erosion and slope are the main limitations to use of the soils as cropland.

These soils have good potential for use as habitat for openland and woodland wildlife. They have fair potential for most urban uses. The clayey subsoil and the moderate permeability are the main limitations.

4. Uchee-Blanton

Deep, well drained and moderately well drained soils that have sandy surface and subsurface layers and a dominantly loamy subsoil; formed in marine sediment of the Coastal Plain

These soils are gently sloping to strongly sloping. They are on broad ridgetops and side slopes mainly in the south-central part of the county.

This map unit makes up about 9 percent of the county. About 44 percent of the unit is Uchee soils, and about 36 percent is Blanton soils. The rest is soils of minor extent.

Uchee soils are well drained and have loamy sand surface and subsurface layers 20 to 40 inches thick. Blanton soils are moderately well drained and have loamy sand surface and subsurface layers 40 to 80 inches thick.

The minor soils in this unit are the well drained to moderately well drained Cowarts soils, the well drained Marvyn soils, and the poorly drained Kinston soils.

The soils in this map unit are used mainly for cultivated crops and pasture. Most of the acreage has been cleared. The soils have fair to poor potential for cultivated row crops and fair to good potential for pasture and hay crops. Slope and the low available water capacity are the main limitations to use of the soils as cropland.

These soils have fair potential as habitat for openland and woodland wildlife. They have good to fair potential for most urban uses. Slope and the moderately slow permeability of the Uchee soils are limitations to urban uses. In addition, in wet seasons the soils have a perched water table at a depth of about 5 feet.

detailed soil map units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and management of the soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Uchee loamy sand, 0 to 6 percent slopes, is one of several phases in the Uchee series.

Some map units are made up of two or more major soils. These map units are called soil complexes.

A *soil complex* consists of two or more soils, or of one or more soils and a miscellaneous area, in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Marvyn-Urban land complex, 1 to 8 percent slopes, is an example.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Pits is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 5 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

soil descriptions

2—Appling sandy loam, 1 to 6 percent slopes. This is a deep, well drained, gently sloping soil on ridgetops of the Piedmont Plateau. Slopes are smooth and convex. Individual areas are 5 to 450 acres in size.

Typically, the surface layer is brown sandy loam about 8 inches thick. The subsoil is brownish yellow sandy clay loam to a depth of 11 inches, strong brown and brownish yellow clay to a depth of 35 inches, and reddish yellow clay loam to a depth of about 54 inches. In the lower and middle parts there are mottles in shades of yellow, red, and brown. The underlying material is reddish yellow saprolite; it extends to a depth of 60 inches or more.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid throughout except for the surface layer where lime has been added. Permeability and the available water capacity are moderate. The soil has good tilth and can be worked within a moderately wide range of moisture content. The root zone is deep and is easily penetrated by plant roots.

Included with this soil in mapping are areas of Appling soils that have a surface layer of gravelly sandy loam and areas of Appling soils, on eroded knolls and side slopes, that have a surface layer of reddish brown or yellowish red sandy clay loam. Also included are areas of Cartecay, Durham, and Pacolet soils. The included soils make up about 5 to 20 percent of this map unit, but areas of the included soils generally are less than 3 acres in size.

In some areas this soil is used for cultivated crops and pasture. It has good potential for pasture and hay and fair potential for cultivated crops. Good tilth is easily maintained by returning crop residue to the soil. Erosion

is a moderate hazard if crops are grown. Minimum tillage and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

This soil is used mainly as woodland. It has good potential for loblolly pine, slash pine, and yellow-poplar. There are no significant limitations to woodland use or management.

This soil has good potential for most urban uses. Low strength is a moderate limitation for roads and streets. The moderate permeability of the subsoil is a moderate limitation to use of the soil as septic tank absorption fields. This limitation can be partly overcome by increasing the size of the absorption area or otherwise modifying the design of the filter field.

This soil is in capability subclass IIe and in woodland group 3o.

3—Appling sandy loam, 6 to 10 percent slopes. This is a deep, well drained, sloping soil on dissected ridgetops and side slopes of the Piedmont Plateau. Slopes are complex and convex. Individual areas are 20 to 150 acres in size.

Typically, the surface layer is dark grayish brown sandy loam about 7 inches thick. The subsoil is yellowish brown sandy clay loam to a depth of 10 inches, strong brown clay with mottles of brownish yellow to a depth of 29 inches, and mottled brownish yellow and yellowish brown clay loam to a depth of 44 inches. The underlying material is yellow and red saprolite; it extends to a depth of 60 inches or more.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid throughout except for the surface layer where lime has been added. Permeability and the available water capacity are moderate. The soil has good tilth and can be worked within a moderately wide range of moisture content. The root zone is deep and is easily penetrated by plant roots.

Included with this soil in mapping are areas of Appling soils that have a surface layer of gravelly sandy loam and areas of Appling soils, on eroded knolls and side slopes, that have a surface layer of reddish brown or yellowish red sandy clay loam. Also included are areas of Cartecay, Durham, Louisburg, and Pacolet soils. The included soils make up about 10 to 25 percent of this map unit, but the areas generally are less than 3 acres in size.

In some areas this soil is used for cultivated crops and pasture. It has good potential for pasture and hay and fair potential for cultivated crops. The steepness of the slope and the small size and irregular shape of some of the areas are limitations to use of the soil as cropland. Good tilth is easily maintained by returning crop residue to the soil. Erosion is a moderate to severe hazard if crops are grown. Minimum tillage and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

This soil is used mainly as woodland. It has good potential for loblolly pine, slash pine, and yellow-poplar. There are no significant limitations to woodland use or management.

This soil has good to fair potential for most urban uses. Slope is a moderate to severe limitation for building site development, but this limitation can be overcome by proper design and installation. Low strength is a moderate limitation for roads and streets. The moderate permeability of the subsoil is a moderate limitation to use of the soil as septic tank absorption fields. This limitation can be partly overcome by increasing the size of the absorption area or otherwise modifying the design of the filter field.

This soil is in capability subclass IIIe and in woodland group 3o.

4—Blanton loamy sand, 0 to 5 percent slopes. This is a deep, moderately well drained, nearly level to gently sloping soil on ridgetops of the Coastal Plain. Slopes are smooth and convex. Individual areas are 5 to several hundred acres in size.

Typically, the surface layer is very dark grayish brown loamy sand about 9 inches thick. The subsurface layer is yellowish brown loamy sand; it extends to a depth of about 48 inches. The subsoil to a depth of 56 inches is very pale brown sandy loam with yellowish brown mottles. Below that, to a depth of 67 inches, it is mottled yellowish brown, brownish yellow, and light gray sandy clay loam. The underlying material, to a depth of 86 inches, is mottled yellowish brown, brownish yellow, light gray, and red stratified clay and sandy loam. To a depth of 99 inches, it is red sandy clay loam with reddish yellow mottles.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid throughout except for the surface layer where lime has been added. Permeability is rapid in the surface and subsurface layers and moderate in the subsoil. The available water capacity is low. The soil has good tilth and can be worked within a wide range of moisture content. The root zone is deep and is easily penetrated by plant roots.

Included with this soil in mapping are soils similar to Blanton soils; they have a surface layer of gravelly loamy sand, gravelly sand, or sand. Also included are a few areas of Cowarts, Kinston, and Marvyn soils. The included soils make up about 5 to 15 percent of this map unit, but each area generally is less than 2 acres in size.

This soil is used mainly for cultivated crops. It has fair to poor potential for row crops. The low available water capacity is a limitation. Good tilth is easily maintained. Erosion is a slight hazard if crops are grown.

In many areas this soil is used for pasture and as woodland. It has fair potential for pasture and hay provided deep-rooting plants are grown. It has good potential for slash pine, loblolly pine, and longleaf pine. Because of the sandy texture, the use of equipment is

moderately restricted, and the seedling mortality rate is moderate.

This soil has good potential for most urban uses. Because of the sandy texture, cutbanks cave when excavations are made. The low available water capacity is a limitation to establishing and maintaining lawns and shrubs. This limitation can be overcome by frequent application of water during dry periods. Seasonal wetness is a moderate limitation to use of the soil as septic tank absorption fields.

This soil is in capability subclass IIIs and in woodland group 3s.

5—Blanton loamy sand, 5 to 10 percent slopes. This is a deep, moderately well drained, sloping soil on side slopes of the Coastal Plain. Slopes are smooth and convex. Individual areas are 15 to 350 acres in size.

Typically, the surface layer is grayish brown loamy sand about 6 inches thick. The subsurface layer is yellowish brown loamy sand; it extends to a depth of 56 inches. The subsoil is yellowish brown sandy clay loam; it extends to a depth of 70 inches or more. In the lower part it is mottled with pale brown and gray.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid throughout except for the surface layer where lime has been added. Permeability is rapid in the surface and subsurface layers and moderate in the subsoil. The available water capacity is low. The soil has good tilth and can be worked within a wide range of moisture content. The root zone is deep and is easily penetrated by plant roots.

Included with this soil in mapping are soils similar to Blanton soils except they have a surface layer of gravelly loamy sand or gravelly sand. Also included are a few areas of Cowarts, Kinston, and Marvyn soils. In some areas, slopes range to 15 percent. The included soils make up 15 to 20 percent of this map unit, but the areas generally are less than 3 acres in size.

In many areas this soil is used for pasture and cultivated crops. It has poor potential for cultivated crops. Slope and the low available water capacity are limitations. Good tilth is easily maintained. Erosion is a slight hazard if crops are grown. The soil has fair potential for pasture and hay provided deep-rooting plants are grown.

This soil is used mainly as woodland. It has good potential for slash pine, loblolly pine, and longleaf pine. Because of the sandy texture, the use of equipment is moderately restricted, and the seedling mortality rate is moderate.

This soil has fair to good potential for most urban uses. Because of the sandy texture cutbanks cave when excavations are made. Slope and wetness, in places, are moderate limitations to building site development, but these limitations can be overcome by proper design and installation. The low available water capacity is a limitation to establishing and maintaining lawns and shrubs. This limitation can be overcome by frequent application of water during dry periods.

This soil is in capability subclass IVs and in woodland group 3s.

6—Cartecay silt loam, 0 to 1 percent slopes. This is a deep, somewhat poorly drained, nearly level soil on narrow flood plains along streams and drainageways of the Piedmont Plateau. Individual areas are 5 to several hundred acres in size.

Typically, the surface layer is dark brown silt loam about 3 inches thick. The layer below that is dark yellowish brown fine sandy loam; it extends to a depth of about 7 inches. The underlying material, to a depth of 18 inches, is brown, strong brown, and dark reddish brown loam with thin lenses of loamy sand. It is mottled brown, reddish brown, and grayish brown silt loam to a depth of 33 inches; grayish brown silt loam mottled with reddish brown to a depth of 37 inches; and grayish brown loamy sand with thin lenses of silt loam to a depth of 58 inches. Below a depth of 58 inches it is very dark gray silt loam and has thin lenses of sandy loam.

This soil is low in natural fertility and in content of organic matter. It is slightly acid to strongly acid throughout except for the surface layer where lime has been added. Permeability is moderately rapid, and the available water capacity is moderate. The soil has good tilth and can be worked within a moderate range of moisture content. It is subject to occasional flooding for brief periods, generally in winter. The water table is near the surface in winter. The root zone is deep and is easily penetrated by plant roots.

Included with this soil in mapping are areas of Cartecay soils that have a surface layer of loam or sandy loam. Also included are areas of Toccoa and Enoree soils. Also included are areas of soils that are at a slightly higher elevation than the Cartecay soil and have a yellowish brown to yellowish red sandy clay loam subsoil. The included soils make up about 10 to 25 percent of this map unit, but the areas generally are less than 5 acres in size.

In some areas this soil is used for cultivated crops. It has fair potential for use as cropland. Flooding usually occurs for brief periods late in winter or early in spring, but it is only a slight hazard to crops. However, wetness often delays planting and interferes with tillage.

This soil is used mainly as woodland or for pasture. It has good potential for adapted pasture and hay crops. It has good potential for loblolly pine, eastern cottonwood, yellow-poplar, and sweetgum. Wetness is a moderate limitation to the use of equipment.

This soil has poor potential for most urban uses. Flooding and wetness are severe limitations that are difficult to overcome.

This soil is in capability subclass IIIw and in woodland group 2w.

7—Cecil sandy loam, 1 to 6 percent slopes. This is a deep, well drained, gently sloping soil on moderately

broad to broad ridgetops of the Piedmont Plateau. Slopes are smooth and convex. Individual areas are 5 to several hundred acres in size.

Typically, the surface layer is reddish brown sandy loam about 4 inches thick. The subsoil is red clay loam to a depth of 7 inches, red clay to a depth of 48 inches, and red sandy clay loam to a depth of 60 inches. The underlying material is red, reddish brown, and strong brown saprolite.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid throughout except for the surface layer where lime has been added. Permeability and the available water capacity are moderate. The soil has good tilth and can be worked within a moderately wide range of moisture content. The root zone is deep and is easily penetrated by plant roots.

Included with this soil in mapping are areas of Cecil soils that have a surface layer of gravelly or cobbly sandy loam or loam and areas of Cecil soils, on eroded knolls and side slopes, that have a surface layer of reddish brown or yellowish red sandy clay loam. Also included are areas of Cartecay soils, Pacolet soils, and a soil similar to the Cecil soil except that it has slightly less clay in the subsoil. The included soils make up about 5 to 20 percent of this unit, but the areas generally are less than 2 acres in size.

In some areas this soil is used for pasture and cultivated crops. It has good potential for pasture and hay (fig. 1). It has fair potential for cultivated crops. Slope and the small size and irregular shape of some of the areas are limitations to use of the soil as cropland. Good tilth is easily maintained by returning crop residue to the soil. Erosion is a moderate hazard if crops are grown. Minimum tillage and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

This soil is used mainly as woodland. It has good potential for loblolly pine, slash pine, and yellow-poplar.

Figure 1.—Tall fescue pasture in an area of Cecil sandy loam, 1 to 6 percent slopes.

There are no significant limitations to woodland use or management.

This soil has good potential for most urban uses. Low strength is a moderate limitation for roads and streets. The moderate permeability of the subsoil is a moderate limitation to use of the soil as septic tank absorption fields. This limitation can be partly overcome by increasing the size of the absorption area or otherwise modifying the design of the filter field.

This soil is in capability subclass IIe and in woodland group 3o.

8—Cecil sandy loam, 6 to 10 percent slopes. This is a deep, well drained, sloping soil on moderately broad to broad ridgetops and on the upper part of side slopes of the Piedmont Plateau. Slopes are mostly smooth and convex. Individual areas are 15 to 450 acres in size.

Typically, the surface layer is reddish brown sandy loam about 6 inches thick. The subsoil is red clay to a depth of 27 inches, red clay loam mottled with yellowish brown to a depth of 48 inches, and red sandy clay loam with thin lenses of soft saprolite to a depth of 60 inches. The underlying material is mottled red, brown, and yellow saprolite.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid throughout except for the surface layer where lime has been added. Permeability and the available water capacity are moderate. The soil has good tilth and can be worked within a moderately wide range of moisture content. The root zone is deep and is easily penetrated by plant roots.

Included with this soil in mapping are areas of Cecil soils that have a surface layer of gravelly or cobbly sandy loam or loam and areas of Cecil soils, on eroded knolls and side slopes, that have a surface layer of reddish brown or yellowish red sandy clay loam. Also included are a few areas of Cartecay soils, Pacolet soils, and a soil similar to the Cecil soil except that it has slightly less clay in the subsoil. The included soils make up about 5 to 15 percent of this map unit, but each area generally is less than 2 acres in size.

In some areas this soil is used for pasture and cultivated crops. It has good potential for pasture and hay and fair potential for row crops. Slope, the irregular shape of the areas, and the steepness of adjacent soils are limitations to use as cropland. Good tilth is easily maintained by returning crop residue to the soil. Erosion is a moderate hazard if crops are grown. Minimum tillage and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

This soil is used mainly as woodland. It has good potential for loblolly pine, slash pine, and yellow-poplar. There are no significant limitations to woodland use or management.

This soil has fair potential for most urban uses. Slope is a moderate limitation for most building site development, but this limitation can be overcome by proper design. Low strength is a moderate limitation for roads and streets. The moderate permeability of the subsoil is a moderate limitation to use of the soil as septic tank absorption fields. This limitation can be partly overcome by increasing the size of the absorption area or otherwise modifying the design of the filter field.

This soil is in capability subclass IIIe and in woodland group 3o.

9—Cecil sandy loam, 10 to 15 percent slopes. This is a deep, well drained, strongly sloping soil on narrow to moderately broad side slopes of the Piedmont Plateau. Slopes are complex and convex. Individual areas are 20 to 850 acres in size.

Typically, the surface layer is reddish brown sandy loam about 7 inches thick. The subsoil is red clay to a depth of 45 inches and red clay loam to a depth of 57 inches. The underlying material is mottled red, brown, and yellow highly weathered saprolite.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid throughout except for the surface layer where lime has been added. Permeability and the available water capacity are moderate. The soil has good tilth and can be worked within a moderately wide range of moisture content. The root zone is deep and is easily penetrated by plant roots.

Included with this soil in mapping are areas of Cecil soils that have a surface layer of gravelly or cobbly sandy loam or loam and areas of Cecil soils, on eroded knolls or side slopes, that have a surface layer of reddish brown or yellowish red sandy clay loam or clay loam. Also included are a few areas of Cartecay, Pacolet, and Toccoa soils and a soil similar to the Cecil soil except that it has slightly less clay in the subsoil. The included soils make up about 5 to 15 percent of this map unit, but the areas generally are less than 3 acres in size.

This soil has poor potential for cultivated crops. The steep slopes and the irregular shape of the areas are limitations to use of the soil as cropland. Erosion is a severe hazard if cultivated crops are grown. Minimum tillage and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion. In some areas this soil is used for pasture. It has good potential for pasture.

This soil is used mainly as woodland. It has good potential for loblolly pine, slash pine, and yellow-poplar. There are no significant limitations to woodland use or management.

This soil has fair potential for most urban uses. Slope is a moderate limitation for building site development. Slope and the moderate permeability of the subsoil are moderate limitations to use of the soil as septic tank absorption fields. These limitations can be partly overcome by proper design and installation. Low strength is a moderate limitation for roads and streets.

This soil is in capability subclass IVe and in woodland group 3o.

10—Cecil cobbly loam, 10 to 25 percent slopes. This is a deep, well drained, strongly sloping to steep soil on narrow to moderately wide side slopes of the Piedmont Plateau. Slopes are complex and convex. Individual areas are 30 to 275 acres in size.

Typically, the surface layer is very dark grayish brown cobbly loam about 3 inches thick. The subsurface layer is yellowish brown loam; it extends to a depth of 8 inches. The subsoil is red clay to a depth of 26 inches, red clay loam with light yellowish brown and yellow mottles to a depth of 42 inches, and mottled red, light yellowish brown, and yellow sandy clay loam to a depth of 48 inches. The underlying material is mottled red, light yellowish brown, and pale brown highly weathered saprolite.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid throughout except for the surface layer where lime has been added. Permeability and the available water capacity are moderate. The soil has good tilth. The root zone is deep and is easily penetrated by plant roots.

Included with this soil in mapping are areas of Cecil soils that have a surface layer of sandy loam or gravelly sandy loam. Also included are a few areas of Louisburg and Pacolet soils and some small areas where the soils have a few stones on the surface. The included soils make up about 10 to 25 percent of the map unit, but areas are generally less than 5 acres in size.

This soil has poor potential for cultivated crops. Steep and complex slopes and coarse fragments on the surface are limitations to use of the soil as cropland. This soil has fair potential for pasture.

This soil is used mainly as woodland. It has good potential for loblolly pine and slash pine. There are no significant limitations to woodland use or management where slopes are 10 to 15 percent. Where slopes are more than 15 percent, erosion and the seedling mortality rate are moderate limitations.

This soil has fair to poor potential for urban uses. Slope is a severe limitation for most urban uses. This limitation generally can be overcome by proper design and installation. Low strength is a moderate limitation for roads and streets. Coarse fragments on the surface are a severe limitation for lawns.

This soil is in capability subclass VIe and in woodland group 3r.

11—Cowarts loamy sand, 2 to 6 percent slopes. This is a deep, well drained to moderately well drained, gently sloping soil on narrow to moderately broad ridgetops of the Coastal Plain. Slopes are smooth to uneven and convex. Individual areas are 20 to 300 acres in size.

Typically, the surface layer is dark grayish brown loamy sand about 5 inches thick. The subsurface layer is yellowish brown sandy loam; it extends to a depth of 15 inches. The subsoil is yellowish brown sandy loam to a depth of 20 inches, brownish yellowish sandy clay loam with strong brown mottles to a depth of 25 inches, and mottled yellowish brown, very pale brown, and red sandy clay loam to a depth of 34 inches. The underlying material is mottled red, yellow, and gray strata of sandy loam, sandy clay loam, and clay to a depth of 59 inches. It is mottled white, red, yellow, and brown sandy loam to a depth of 80 inches or more.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid throughout except for the surface layer where lime has been added. Permeability is moderate to moderately slow in the subsoil and moderately slow to slow in the substratum. The available water capacity is low to moderate. The soil has good tilth and can be worked within a moderately wide range of moisture content. The root zone is moderately deep; plant roots are somewhat restricted by the massive substratum.

Included with this soil in mapping are areas of Cowarts soils that have a surface layer of gravelly loamy sand. Also included are a few areas of Marvyn soils and Uchee soils and some soils, in narrow drainageways, that are similar to Kinston soils. The included soils make up about 5 to 15 percent of this map unit, but areas generally are less than 5 acres in size.

This soil is used mainly as cropland. It has fair potential for cultivated crops. Good tilth can be maintained by returning crop residue to the soil.

In some areas this soil is used as woodland and for pasture. It has good potential for pasture and hay. It has good potential for loblolly pine and slash pine. There are no significant limitations to woodland use or management.

This soil has good potential for most urban uses and for building site development. Slope is a moderate limitation for small commercial buildings, but this limitation can be overcome by proper design. The moderately slow to slow permeability of the substratum is a severe limitation to use of the soil as septic tank absorption fields. In wet seasons the water table is often perched above the substratum; the duration of the perched water table depends on the amount of rainfall and the nature of the substratum. The slow permeability and the perched water table are limitations that are difficult to overcome.

This soil is in capability subclass IIe and in woodland group 2o.

12—Cowarts loamy sand, 6 to 10 percent slopes. This is a deep, well drained to moderately well drained, sloping soil on narrow side slopes of the Coastal Plain. Slopes are smooth to complex and convex. Individual areas are 10 to 250 acres in size.

Typically, the surface layer is dark grayish brown loamy sand about 6 inches thick. The subsoil is light yellowish brown sandy clay loam to a depth of 15 inches

and yellow sandy clay loam with red, strong brown, pale brown, and gray mottles to a depth of 37 inches. The underlying material is yellow sandy loam with pale brown, strong brown, and gray mottles; it extends to a depth of 60 inches or more.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid throughout except for the surface layer where lime has been added. Permeability is moderate to moderately slow in the subsoil and moderately slow to slow in the substratum. The available water capacity is low to moderate. The soil has good tilth and can be worked within a moderately wide range of moisture content. The root zone is moderately deep; however, plant roots are somewhat restricted by the massive substratum.

Included with this soil in mapping are areas of Cowarts soils that have a surface layer of gravelly loamy sand. Intermingled with the Cowarts soil are a few areas of Marvyn soils and Uchee soils. Also included are some soils, in narrow drainageways, that are similar to Kinston soils. The included soils make up about 5 to 20 percent of this map unit, but areas of the included soils generally are less than 5 acres in size.

In some areas this soil is used for crops and pasture. It has fair potential for row crops and good potential for pasture and hay. The narrowness of the areas and the complex slopes are limitations to use as cropland. Erosion is a moderate hazard if crops are grown. Minimum tillage and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

This soil is used mainly as woodland. It has good potential for loblolly pine and slash pine. There are no significant limitations to woodland use or management.

This soil has good to fair potential for most urban uses and for building site development. Slope is a moderate to severe limitation for building site development, but this limitation can be easily overcome by proper design and installation. The moderately slow to slow permeability of the substratum is a severe limitation to use of the soil as septic tank absorption fields. In wet seasons the water table is often perched above the substratum; the duration of the perched water table depends on the amount of rainfall. The slow permeability and the perched water table are limitations that are difficult to overcome.

This soil is in capability subclass IIIe and in woodland suitablity 2o.

13—Cowarts loamy sand, 10 to 15 percent slopes. This is a deep, well drained to moderately well drained, strongly sloping soil on narrow side slopes of the Coastal Plain. Slopes are smooth to complex and convex. Individual areas are 15 to 135 acres in size.

Typically, the surface layer is brown loamy sand about 9 inches thick. The subsoil is yellowish red sandy clay loam with yellowish brown and pale brown mottles to a depth of 16 inches and mottled yellowish brown, gray, and red sandy clay to a depth of 28 inches. The underlying material is light gray sandy clay loam that has strata of sandy loam and yellow, brown, and red mottles.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid throughout except for the surface layer where lime has been added. Permeability is moderate to moderately slow in the subsoil and moderately slow to slow in the substratum. The available water capacity is low to moderate. The soil has good tilth and can be worked within a moderately wide range of moisture content. The root zone is moderately deep; however, plant roots are somewhat restricted by the massive substratum.

Included with this soil in mapping are areas of Cowarts soils that have a surface layer of gravelly loamy sand. Also included are a few areas of Marvyn and Uchee soils. The included soils make up about 10 to 25 percent of this map unit, but areas generally are less than 5 acres in size.

This soil has poor potential for cultivated crops. The steep and complex slopes are a limitation to use as cropland. Erosion is a severe hazard if crops are grown. This soil has good potential for pasture and hay.

Nearly all of this soil is used as woodland. The soil has good potential for loblolly pine and slash pine. There are no significant limitations to woodland use or management.

This soil has fair potential for most urban uses and for building site development. Slope is a moderate to severe limitation for building site development, but this limitation can be overcome by proper design and construction. The moderately slow to slow permeability of the substratum is a severe limitation to use of the soil as septic tank absorption fields. This limitation is difficult to overcome.

This soil is in capability subclass IVe and in woodland group 2o.

14—Durham sandy loam, 1 to 6 percent slopes. This is a deep, well drained, gently sloping soil on moderately wide ridgetops and foot slopes of the Piedmont Plateau. Slopes are smooth and convex. Individual areas are 50 to several hundred acres in size.

Typically, the surface layer is brown sandy loam about 6 inches thick. The subsoil is yellowish brown sandy loam to a depth of 10 inches, yellowish brown sandy clay loam to a depth of 23 inches, yellowish brown clay loam with red mottles to a depth of 36 inches, and mottled brown, red, yellow, and gray clay loam to a depth of 59 inches. The underlying material is mottled yellow, red, and gray saprolite.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid except for the surface layer where lime has been added. Permeability and the available water capacity are moderate. The soil has good tilth and can be worked within a moderately wide range of moisture content. The root zone is deep and is easily penetrated by plant roots.

Included with this soil in mapping are areas of Durham soils that have a surface layer of loamy sand or gravelly sandy loam and areas of Durham soils, on eroded knolls, that have a surface layer of yellowish brown loam or sandy clay loam. Also included are a few areas of Appling, Cartecay, and Cecil soils. The included soils make up about 5 to 10 percent of this map unit, but their areas generally are less than 2 acres in size.

In some areas this soil is used for pasture. It has good potential for pasture and hay. The soil also has good potential for cultivated crops. Good tilth is easily maintained by returning crop residue to the soil. Minimum tillage and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

This soil is used mainly as woodland. It has good potential for loblolly pine, slash pine, and yellow-poplar. There are no significant limitations to woodland use or management.

This soil has good potential for urban uses. There are no significant limitations for building site development or for septic tank absorption fields.

This soil is in capability subclass IIe and in woodland group 3o.

15—Enoree silt loam, 0 to 1 percent slopes. This is a deep, poorly drained, nearly level soil on narrow flood plains along streams and drainageways of the Piedmont Plateau. Individual areas are 25 to 425 acres in size.

Typically, the surface layer is mottled yellowish brown, strong brown, pale brown, and reddish brown silt loam about 9 inches thick. The underlying material is gray silt loam with brown mottles to a depth of 18 inches, mottled dark grayish brown and dark brown silt loam to a depth of 30 inches, and grayish brown silt loam with dark brown mottles to a depth of 42 inches. Below that, to a depth of 60 inches or more, it is gray silty clay loam and has mottles in shades of brown and yellow.

This soil is low in natural fertility and moderate in content of organic matter. It is slightly acid to strongly acid except for the surface layer where lime has been added. Permeability is moderately rapid, and the available water capacity is moderate. The soil has good tilth and can be worked within a moderate range of moisture content. It is subject to frequent flooding for brief periods, generally in winter. The water table is at or near the surface from November to April. The root zone is deep and is easily penetrated by plant roots.

Included with this soil in mapping are a few areas of Cartecay and Toccoa soils. The included soils make up about 5 to 15 percent of this map unit, but areas generally are less than 2 acres in size.

This soil has poor potential for cultivated crops. The high water table and the hazard of flooding are limitations to use as cropland. Field ditches help remove excess water and reduce ponding. In some areas this soil is used as pasture. It has fair potential for pasture.

This soil is used mainly as woodland. It has fair potential for loblolly pine, sweetgum, and eastern cottonwood. Because of wetness, the seedling mortality rate is severe, and the use of equipment is severely restricted. The soil has good potential for loblolly pine and slash pine if the surface is adequately drained.

This soil has poor potential for urban uses. Wetness and the hazard of flooding are severe limitations that are difficult to overcome.

This soil is in capability subclass Vw and in woodland group 2w.

16—Gwinnett sandy loam, 1 to 6 percent slopes. This is a moderately deep, well drained, gently sloping soil on narrow ridgetops of the Piedmont Plateau. Slopes are smooth and convex. Individual areas are 50 to 125 acres in size.

Typically, the surface layer is dark reddish brown sandy loam about 8 inches thick. The subsoil is dark red clay; it extends to a depth of 39 inches. The underlying material is soft multicolored saprolite; it extends to a depth of 50 inches or more.

This soil is low in natural fertility and in content of organic matter. It is medium acid or strongly acid throughout except for the surface layer where lime has been added. Permeability is moderate, and the available water capacity is low to moderate. The soil has fair to good tilth and can be worked within a moderately wide range of moisture content. The root zone is moderately deep and is easily penetrated by plant roots.

Included with this soil in mapping are areas of Gwinnett soils that have a surface layer of gravelly sandy loam or gravelly loam and soils similar to Gwinnett sandy loam except that they also have a surface layer of gravelly sandy loam or gravelly loam. Also included are areas of Gwinnett soils, on eroded knolls and side slopes, that have a surface layer of clay loam and areas of Cecil, Hiwassee, and Pacolet soils. The included soils make up about 5 to 20 percent of this map unit.

This soil is used mainly for pasture. It has good potential for pasture and hay. It has fair potential for row crops. The irregular shape of the areas and the low to moderate available water capacity are limitations to use of the soil as cropland. Erosion is a moderate hazard if cultivated crops are grown. Minimum tillage and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

In some areas this soil is used as woodland. It has good potential for loblolly pine, slash pine, and yellow-poplar. There are no significant limitations to woodland use or management.

This soil has good potential for most urban uses. The moderate permeability of the subsoil is a moderate limitation to use of the soil as septic tank absorption fields. This limitation can be partly overcome by increasing the size of the absorption field. Low strength is a moderate limitation for roads and streets.

This soil is in capability subclass IIe and in woodland group 3o.

17—Gwinnett sandy loam, 6 to 10 percent slopes. This is a moderately deep, well drained, sloping soil on narrow ridgetops and side slopes of the Piedmont Plateau. Slopes are complex and convex. Individual areas are 70 to several hundred acres in size.

Typically, the surface layer is dark reddish brown sandy loam about 4 inches thick. The subsoil is dark red clay; it extends to a depth of 25 inches. The underlying material is soft, highly weathered hornblende schist; it extends to a depth of 40 inches or more.

This soil is low in natural fertility and in content of organic matter. It is medium acid or strongly acid throughout except for the surface layer where lime has been added. Permeability is moderate, and the available water capacity is low. The soil has fair to good tilth and can be worked within a moderately wide range of moisture content. The root zone is moderately deep and is easily penetrated by plant roots.

Included with this soil in mapping are areas of Gwinnett soils that have a surface layer of gravelly sandy loam or gravelly loam and areas of Gwinnett soils, on eroded knolls and side slopes, that have a surface layer of clay loam. Also included are a few areas of Cecil, Hiwassee, and Pacolet soils. The included soils make up about 10 to 30 percent of this map unit.

This soil has fair potential for row crops. The complex slopes and the irregular shape of the areas are limitations. Erosion is a moderate to severe hazard if cultivated crops are grown. Minimum tillage and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

This soil is used mainly for pasture or as woodland. It has good potential for pasture and hay. It has good potential for loblolly pine, slash pine, and yellow-poplar (fig. 2). There are no significant limitations to woodland use or management.

This soil has fair potential for most urban uses. Slope is a moderate limitation for building site development, but this limitation can be overcome by proper design and installation. The moderate permeability of the subsoil is a moderate limitation to use of the soil as septic tank absorption fields. This limitation can be partly overcome by increasing the size of the absorption area. Low strength is a moderate limitation for roads and streets.

This soil is in capability subciass IIIe and in woodland group 3o.

18—Gwinnett sandy loam, 10 to 15 percent slopes. This is a moderately deep, well drained, strongly sloping soil on narrow side slopes of the Piedmont Plateau. Slopes are smooth to complex and convex. Individual areas are 65 to several hundred acres in size.

Typically, the surface layer is dark reddish brown sandy loam about 4 inches thick. The subsoil is dark red clay to a depth of 23 inches and dark red clay loam to a depth of 33 inches. The underlying material is soft, highly weathered hornblende schist; it extends to a depth of 50 inches or more.

This soil is low in natural fertility and in content of organic matter. It is medium acid or strongly acid throughout except for the surface layer where lime has been added. Permeability is moderate, and the available water capacity is low. The soil has fair tilth and can be worked within a moderately wide range of moisture content. The root zone is moderately deep and is easily penetrated by plant roots.

Included with this soil in mapping are areas of Gwinnett soil that have a surface layer of gravelly sandy loam or gravelly loam and soils similar to Gwinnett soils except that they also have a surface layer of gravelly loam or gravelly sandy loam. Also included are areas of Gwinnett soils, on eroded knolls and side slopes, that have a surface layer of clay loam and a few areas of Cecil, Hiwassee, and Pacolet soils. The included soils make up about 15 to 25 percent of this map unit.

This soil has poor potential for cultivated crops. The steep, complex slopes and the irregular shape of the soil areas are limitations. Erosion is a severe hazard if cultivated crops are grown.

This soil is used mainly as woodland or for pasture.

It has good potential for pasture and hay. It has good potential for loblolly pine, slash pine, and yellow-poplar. There are no significant limitations to woodland use or management.

This soil has fair potential for most urban uses. Slope is a moderate limitation for building site development. Slope and the moderate permeability of the subsoil are moderate limitations to use of the soil as septic tank absorption fields. These limitations can be partly overcome by proper design and installation. Low strength is a moderate limitation for roads and streets.

This soil is in capability subclass IVe and in woodland group 3o.

19—Hiwassee sandy loam, 1 to 6 percent slopes. This is a deep, well drained, gently sloping soil on narrow to moderately wide ridgetops of the Piedmont Plateau. Slopes are smooth and convex. Individual areas are 25 to 480 acres in size.

Typically, the surface layer is dark reddish brown sandy loam about 4 inches thick. The subsoil is dark red clay to a depth of 26 inches and dark red clay loam to a depth of 48 inches. The underlying material is red, highly weathered saprolite that crushes to sandy clay loam; it extends to a depth of 80 inches or more.

This soil is low in natural fertility and in content of organic matter. It is slightly acid to very strongly acid except for the surface layer where lime has been added. Permeability and the available water capacity are moderate. The soil has fair to good tilth and can be

Figure 2.—Gwinnett sandy loam, 6 to 10 percent slopes, is suited to loblolly pine.

worked within a moderate range of moisture content. The root zone is deep and is easily penetrated by plant roots.

Included with this soil in mapping are areas of Hiwassee soils that have a surface layer of gravelly sandy loam or gravelly loam and soils similar to Hiwassee soils except that they also have a surface layer of gravelly sandy loam or gravelly loam. Also included are areas of Hiwassee soils, on eroded knolls and side slopes, that have a surface layer of dark red sandy clay loam, sandy clay, or clay loam and areas of Cecil, Gwinnett, and Pacolet soils. The included soils

make up about 10 to 25 percent of this map unit, but the areas generally are less than 3 acres in size.

In some areas this soil is used for pasture and cultivated crops. It has good potential for pasture and hay and fair to good potential for cultivated crops. Good tilth is easily maintained by returning crop residue to the soil. Minimum tillage and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

This soil is used mainly as woodland. It has good potential for loblolly pine, slash pine, and yellow-poplar. There are no significant limitations to woodland use or management.

This soil has good potential for most urban uses. Low strength is a moderate limitation for roads and streets. The moderate permeability of the subsoil is a limitation to the use of the soil as septic tank absorption fields. This limitation can be partly overcome by increasing the size of the absorption area or otherwise modifying the design of the filter field.

This soil is in capability subclass IIe and in woodland group 3o.

20—Hiwassee sandy loam, 6 to 10 percent slopes. This is a deep, well drained, sloping soil on narrow ridgetops and side slopes of the Piedmont Plateau. Slopes are convex and mostly convex. Individual areas are 25 to 300 acres in size.

Typically, the surface layer is dusky red sandy loam about 8 inches thick. The subsoil is dark reddish brown clay to a depth of 18 inches, dark red clay to a depth of 44 inches, and dark red clay loam with lenses of soft saprolite to a depth of 54 inches. The underlying material is soft saprolite; it extends to a depth of 80 inches or more.

This soil is low in natural fertility and in content of organic matter. It is slightly acid to very strongly acid except for the surface layer where lime has been added. Permeability and the available water capacity are moderate. The soil has fair to good tilth and can be worked within a moderate range of moisture content. The root zone is deep and is easily penetrated by plant roots.

Included with this soil in mapping are areas of Hiwassee soils that have a surface layer of gravelly loam and soils similar to Hiwassee soils except that they also have a surface layer of gravelly loam. Also included are areas of Hiwassee soils, on eroded knolls and side slopes, that have a surface layer of dark red sandy clay loam or clay loam and a few areas of Cecil, Gwinnett, and Pacolet soils. In an area about 5 miles north-northeast of Opelika the soil is gullied. The included soils make up about 5 to 25 percent of this map unit, but each area generally is less than 5 acres in size.

In some areas this soil is used for pasture. It has good potential for pasture and hay. This soil has fair potential for cultivated crops; the steep complex slopes are a limitation. Erosion is a moderate hazard if cultivated crops are grown. Good tilth can be maintained or improved by returning crop residue to the soil. Minimum tillage and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

This soil is used mainly as woodland. It has good potential for loblolly pine, slash pine, and yellow-poplar. There are no significant limitations to woodland use or management.

This soil has fair potential for most urban uses. Slope is a moderate limitation to building site development. This limitation can be overcome by proper design and installation. The moderate permeability of the subsoil is a moderate limitation to use of the soil as septic tank absorption fields. This limitation can be partly overcome by increasing the size of the absorption area or otherwise modifying the design of the filter field. Low strength is a moderate limitation for roads and streets.

This soil is in capability subclass IIIe and in woodland group 3o.

21—Kinston silt loam, 0 to 1 percent slopes. This is a deep, poorly drained, nearly level soil on narrow flood plains along streams and drainageways of the Coastal Plain. Individual areas are 5 to several hundred acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 4 inches thick. The underlying material to a depth of 10 inches is dark gray silt loam that has strong brown mottles; to a depth of 20 inches it is very dark gray silt loam; and to a depth of 47 inches it is gray sandy clay loam that has brown mottles. Below that, a layer of gray gravelly sandy clay loam extends to a depth of 55 inches or more.

This soil is low in natural fertility and moderate in content of organic matter. It is strongly acid or very strongly acid except for the surface layer where lime has been added. Permeability is moderate, and the available water capacity is high. It is subject to frequent flooding for brief periods, generally in winter. In most years the water table is at or near the surface from November to June. The soil has good tilth and can be worked within a moderate range of moisture content. The root zone is deep and is easily penetrated by plant roots.

Included with this soil in mapping are a few areas of soils that are at a slightly higher elevation and are dominantly yellow or brown in the upper part. Also included are soils that have a coarser texture. The included soils make up about 10 to 25 percent of this map unit, but the areas generally are less than 3 acres in size.

In some areas this soil is used for pasture. It has fair to good potential for pasture. This soil has poor potential for cultivated crops. Wetness, a seasonal high water table, and the hazard of flooding are limitations to use of the soil as cropland. Field ditches help remove excess water and reduce ponding.

This soil is used mainly as woodland. It has good potential for yellow-poplar, loblolly pine, and slash pine.

Because of the seasonal wetness, the use of equipment is severely restricted and the seedling mortality rate is severe.

This soil has poor potential for urban uses. Wetness and the hazard of flooding are severe limitations that are difficult to overcome.

This soil is in capability subclass VIw and in woodland group 1w.

22—Louisburg sandy loam, 10 to 25 percent slopes. This is a moderately deep, well drained to excessively drained, strongly sloping to moderately steep soil on narrow side slopes of the Piedmont Plateau. Slopes are complex and convex. Individual areas are 30 to about 700 acres in size.

Typically, the surface layer is very dark gray sandy loam about 3 inches thick. The subsurface layer is pale brown sandy loam; it extends to a depth of 8 inches. The subsoil is yellow sandy loam; it extends to a depth of 31 inches. The underlying material is mottled yellowish brown, yellow, and white highly weathered saprolite.

This soil is very low in natural fertility and low in content of organic matter. It is medium acid to very strongly acid throughout except for the surface layer where lime has been added. Permeability is rapid, and the available water capacity is low. The soil has good tilth. The root zone is moderately deep and easily penetrated by plant roots.

Included with this soil in mapping are areas of Louisburg soils and soils similar to Louisburg that have a surface layer of cobbly sandy loam or stony sandy loam. Also included are a few areas of Pacolet soils. Included soils make up about 10 to 25 percent of this map unit, but the areas are generally less than 5 acres in size.

This soil has poor potential for cultivated crops and for pasture. The steep, complex slopes and the low available water capacity are limitations. Erosion is a severe hazard if crops are grown.

This soil is used as woodland. It has good potential for loblolly pine, slash pine, and yellow-poplar. There are no significant limitations to woodland use or management where slopes are less than 15 percent. Where slopes are more than 15 percent, the use of equipment is moderately restricted, and erosion is a moderate hazard.

This soil has fair to poor potential for urban uses. Slope is a severe limitation for most urban uses.

This soil is in capability subclass VIIe and in woodland group 3r.

23—Marlboro loamy sand, 1 to 6 percent slopes. This is a deep, well drained, gently sloping soil on broad ridgetops of the Coastal Plain. Slopes are smooth and convex. Individual areas are 15 to 700 acres in size.

Typically, the surface layer is brown loamy sand about 8 inches thick. The subsoil is pale brown sandy loam to a depth of 13 inches, yellowish brown clay to a depth of 53 inches, and mottled light brownish gray, brownish yellow, strong brown, yellowish red, and red clay to a depth of 85 inches. The underlying material is mottled red, yellow, brown, and gray sandy loam; it extends to a depth of 90 inches or more.

This soil is low in natural fertility and in content of organic matter. It is medium acid to very strongly acid except for the surface layer where lime has been added. Permeability is moderate, and the available water capacity is high. It has good tilth and can be worked within a moderately wide range of moisture content. The root zone is deep and is easily penetrated by plant roots.

Included in mapping are a few areas of Marvyn, Sacul, and Uchee soils. Also included are areas of a soil similar to the Marlboro soil except that the substratum is at a depth of less than 60 inches. The included soils make up about 5 to 15 percent of this map unit but the areas generally are less than 2 acres in size.

This soil is used mainly as cropland. It has good potential for cultivated crops. Good tilth is easily maintained by returning crop residue to the soil. Minimum tillage and the use of cover crops help reduce runoff and control erosion.

In some areas this soil is used for pasture and as woodland. It has good potential for pasture and hay.

It has good potential for loblolly pine and slash pine. There are no significant limitations to woodland use or management.

This soil has good potential for building site development. The moderate permeability of the subsoil is a moderate limitation to use of the soil as septic tank absorption fields. This limitation can be partly overcome by increasing the size of the absorption area or otherwise modifying the design of the filter field.

This soil is in capability subclass IIe and in woodland group 3o.

24—Marvyn loamy sand, 1 to 6 percent slopes. This is a deep, well drained, gently sloping soil on narrow to broad ridgetops of the Coastal Plain. Slopes are smooth and convex. Individual areas are 10 to 800 acres in size.

Typically, the surface layer is dark grayish brown loamy sand about 7 inches thick. The subsoil is yellowish brown sandy loam to a depth of 15 inches, strong brown sandy clay loam to a depth of 30 inches, brownish yellow sandy clay with red mottles to a depth of 44 inches, and yellowish red sandy clay with brownish yellow mottles to a depth of 53 inches. The underlying material is mottled red, brown, and gray stratified sandy loam and clay to a depth of 60 inches. It is reddish yellow sandy loam to a depth of 72 inches or more.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid except for the surface layer where lime has been added. Permeability and the available water capacity are moderate. The soil has good tilth and can be worked within a moderately wide range of moisture content. The root zone is deep and is easily penetrated by plant roots.

Included with this soil in mapping are areas of Marvyn soils that have a surface layer of gravelly sandy loam or

gravelly loamy sand. Also included are a few areas of Blanton, Cowarts, Marlboro, and Uchee soils. The included soils make up about 5 to 20 percent of this map unit, but the areas generally are less than 3 acres in size.

This soil is used mainly as cropland. It has good potential for cultivated crops. Good tilth is easily maintained by returning crop residue to the soil. Minimum tillage, grassed waterways, and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

In some areas this soil is used for pasture and as woodland. It has good potential for pasture and hay.

It has good potential for loblolly pine and slash pine. There are no significant limitations to woodland use or management.

This soil has good potential for urban uses. Low strength is a moderate limitation for roads and streets. There are no other significant limitations.

This soil is in capability subclass IIe and in woodland group 2o.

25—Marvyn loamy sand, 6 to 10 percent slopes. This is a deep, well drained, sloping soil on narrow ridgetops and side slopes of the Coastal Plain. Slopes are smooth to complex and convex. Individual areas are 15 to 200 acres in size.

Typically, the surface layer is dark grayish brown loamy sand about 6 inches thick. The subsoil is brown sandy loam to a depth of 9 inches, strong brown sandy clay loam to a depth of 36 inches, and strong brown sandy loam to a depth of 47 inches. The underlying material is mottled yellow, red, and brown sandy loam; it extends to a depth of 60 inches or more.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid except for the surface layer where lime has been added. Permeability and the available water capacity are moderate. The soil has good tilth and can be worked within a moderately wide range of moisture content. The root zone is deep and is easily penetrated by plant roots.

Included with this soil in mapping are areas of Marvyn soils that have a surface layer of gravelly sandy loam or gravelly loamy sand. Also included are a few areas of Blanton, Cowarts, and Uchee soils. The included soils make up about 10 to 25 percent of this map unit, but the areas generally are less than 3 acres in size.

In some areas this soil is used for pasture and as cropland. It has good potential for pasture and hay and fair potential for cultivated crops. Slope and the irregular shape of some of the areas are limitations to use of the soil as cropland. Good tilth is easily maintained by returning crop residue to the soil. Erosion is a moderate hazard if cultivated crops are grown. Minimum tillage and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

This soil is used mainly as woodland. It has good potential for loblolly pine and slash pine. There are no significant limitations to woodland use or management.

This soil has good to fair potential for most urban uses. Slope is a moderate to severe limitation for building site development and a moderate limitation for septic tank absorption fields. Low strength is a moderate limitation for roads and streets. These limitations can be overcome by proper design and installation.

This soil is in capability subclass IIIe and in woodland group 2o.

26—Marvyn-Urban land complex, 1 to 8 percent slopes. This complex consists of gently sloping to sloping, well drained soils and Urban land. Individual areas range from about 120 to a few hundred acres and are about 45 to 70 percent Marvyn soils and 20 to 45 percent Urban land. The Marvyn soils and Urban land are so intricately mixed that they could not be mapped separately at the scale selected for mapping.

Typically, Marvyn soils have a surface layer of dark grayish brown loamy sand about 7 inches thick. The subsoil is yellowish brown sandy loam to a depth of 15 inches, strong brown sandy clay loam to a depth of 30 inches, brownish yellowish sandy clay with red mottles to a depth of 44 inches, and yellowish red sandy clay to a depth of 53 inches. The underlying material is mottled red, brown, and gray stratified sandy loam and clay to a depth of 60 inches; it is reddish yellow sandy loam to a depth of 72 inches or more.

Urban land consists of areas where the soils have been altered to the extent that classification is not practical. In some areas the soils are covered by buildings, sidewalks, driveways, streets, and other structures. In other areas the soils have been significantly disturbed by cutting, filling, or grading. Runoff is rapid in all areas.

Marvyn soils are low in natural fertility and in content of organic matter. They are strongly acid or very strongly acid except for the surface layer where lime has been added. Permeability and the available water capacity are moderate. The root zone is deep and is easily penetrated by plant roots.

Included in mapping are small areas of Pacolet soils and a few areas of Cowarts and Uchee soils. The included soils make up about 10 percent of most mapped areas.

Marvyn soils are used as building sites and for lawns, gardens, parks, and playgrounds. They have good potential for most urban uses. The soils are well suited to a wide variety of locally grown annual and perennial plants. Erosion is not a major problem except in disturbed areas that are left bare for an extended period.

Marvyn soils have good potential for building site development. Low soil strength is a moderate limitation for roads and streets. There are no other significant limitations to urban use and development.

This unit is not assigned to a capability subclass or a woodland group.

27—Mecklenburg silt loam, 6 to 10 percent slopes. This is a moderately deep, well drained, sloping soil on moderately broad ridgetops and side slopes of the Piedmont Plateau. Slopes are smooth to complex and convex. Individual areas are 10 to 700 acres in size.

Typically, the surface layer is brown silt loam about 7 inches thick. The subsoil is red silty clay to a depth of 21 inches, red silty clay with yellowish red mottles to a depth of 29 inches, and red silty clay loam with yellowish red and strong brown mottles to a depth of 41 inches. The underlying material extends to a depth of 45 inches or more; it is red, yellowish red, and strong brown saprolite that crushes to silty clay loam.

This soil is low to medium in natural fertility and low in content of organic matter. It is medium acid to neutral throughout except for the surface layer where lime has been added. Permeability is slow, and the available water capacity is low to moderate. This soil has fair tilth and can be worked within a moderate range of moisture content. The root zone is moderately deep and is not easily penetrated by plant roots.

Included with this soil in mapping are areas of Mecklenburg soils that have a gravelly surface layer and areas of Mecklenburg soils, on eroded knolls and side slopes, that have a surface layer of yellowish red or red silty clay loam or clay loam. Also included are a few areas of Cecil, Hiwassee, and Pacolet soils and soils that have a yellow subsoil that is very sticky and very plastic. The included soils make up about 10 to 30 percent of this map unit, but the areas generally are less than 5 acres in size.

This soil has fair potential for cultivated crops. Slope and the low to moderate available water capacity are limitations. Soil tilth is easily maintained by returning crop residue to the soil. Erosion is a moderate hazard if crops are grown. This soil has fair potential for pasture and hay.

This soil is used mainly as woodland. It has fair potential for loblolly pine and slash pine. There are no significant limitations to woodland use or management.

This soil has poor potential for most urban uses. The slow permeability of the subsoil is a severe limitation to use of the soil as septic tank absorption fields. This limitation is difficult to overcome.

This soil is in capability subclass IIIe and in woodland group 4o.

28—Orangeburg loamy sand, 1 to 6 percent slopes. This is a deep, well drained, gently sloping soil on narrow to moderately broad ridgetops of the Coastal Plain. Slopes are smooth and convex. Individual areas are 10 to 150 acres in size.

Typically, the surface layer is dark grayish brown loamy sand about 7 inches thick. The subsoil is yellowish red sandy loam to a depth of 17 inches, red sandy clay loam to a depth of 30 inches, and red sandy clay with a few mottles of yellowish brown and strong brown to a depth of 70 inches or more.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid throughout except for the surface layer where lime has been added. Permeability and the available water capacity are moderate. This soil has good tilth and can be worked within a moderately wide range of moisture content. The root zone is deep and is easily penetrated by plant roots.

Included with this soil in mapping are areas of Orangeburg soils that have a surface layer of gravelly loamy sand. Also included are areas of Cowarts, Marvyn, and Uchee soils. The included soils make up about 5 to 15 percent of this map unit, but the areas generally are less than 2 acres in size.

This soil is used mainly as cropland. It has good potential for cultivated crops. Good tilth is easily maintained by returning crop residue to the soil.

In some areas this soil is used for pasture and as woodland. It has good potential for pasture and hay. It has good potential for loblolly pine and slash pine. There are no significant limitations to woodland use or management.

This soil has good potential for urban uses. There are no significant limitations.

This soil is in capability subclass IIe and in woodland group 2o.

29—Orangeburg loamy sand, 6 to 10 percent slopes. This is a deep, well drained, sloping soil on narrow side slopes of the Coastal Plain. Slopes are smooth to complex and convex. Individual areas are 20 to 100 acres in size.

Typically, the surface layer is brown loamy sand about 6 inches thick. The subsoil is yellowish red sandy loam to a depth of 19 inches, yellowish red sandy clay loam to a depth of 32 inches, and red sandy clay loam to a depth of 65 inches or more.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid throughout except for the surface layer where lime has been added. Permeability and the available water capacity are moderate. The soil has good tilth and can be worked within a moderately wide range of moisture content. The root zone is deep and is easily penetrated by plant roots.

Included with this soil in mapping are areas of Orangeburg soils that have a surface layer of gravelly sandy loam and areas of Orangeburg soils, on eroded side slopes, that have a surface layer of reddish brown or yellowish red sandy clay loam. Also included are areas of Cowarts, Marvyn, and Uchee soils. The included soils make up about 10 to 20 percent of this map unit, but the areas generally are less than 3 acres in size.

In some areas this soil is used as cropland and for pasture. It has good potential for pasture and hay and fair potential for cultivated crops. Slope and the small size and irregular shape of the areas are limitations to use of the soil for crops. Good tilth is easily maintained

by returning crop residue to the soil. Erosion is a moderate hazard if cultivated crops are grown. Minimum tillage and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

This soil is used mainly as woodland. It has good potential for loblolly pine and slash pine. There are no significant limitations to woodland use or management.

This soil has fair potential for urban uses. Slope is a moderate to severe limitation for building site development and a moderate limitation for septic tank absorption fields, but this limitation can be overcome by proper design and installation.

This soil is in capability subclass IIIe and in woodland group 2o.

30—Orangeburg complex, 10 to 20 percent slopes. This complex consists of strongly sloping to moderately steep Orangeburg soils and some similar soils. The soils are so intermingled that they could not be mapped separately at the scale selected for mapping.

The soils that are similar to the Orangeburg soils have as much as 15 percent coarse fragments throughout the profile, have a yellower subsoil, or have slightly more clay in the subsoil.

This complex is in the extreme southeast corner of the county. The soils are deep and well drained. Orangeburg soils mainly have slopes of less than 15 percent; the similar soils have steeper slopes. Individual areas of the Orangeburg soils and of the similar soils are mostly 3 to 5 acres in size but may be as much as 10 acres. These soils make up about 70 percent of the complex. Included soils make up the rest.

Typically, the surface layer is brown loamy sand about 10 inches thick. The subsoil is strong brown sandy clay loam to a depth of 14 inches, red sandy clay loam with common mottles of yellowish brown to a depth of 24 inches, and red heavy sandy clay loam with common mottles of yellowish brown to a depth of 60 inches or more.

These soils are low in natural fertility and in content of organic matter. They are strongly acid or very strongly acid. Permeability and the available water capacity are moderate.

Included with this unit in mapping are small areas of Pacolet and Uchee soils and areas of Orangeburg soils that have common to many pebbles on the surface. Also included are areas of a loamy soil that is very gravelly throughout.

The soils making up this complex have poor potential for cultivated crops because of the complexity and steepness of slopes in some areas. Erosion would be a severe hazard if crops were grown. The soils have good potential for pasture and fair potential for hay.

These soils have good potential for loblolly pine and slash pine. On the steeper slopes the use of equipment is moderately restricted.

The soils have fair potential for most urban uses. Slope is a moderate to severe limitation that can be overcome by good design and careful installation. In some areas gravel is a limitation to establishing and maintaining lawns and shrubs.

These soils are in capability subclass VIe and in woodland group 2o.

31—Pacolet sandy loam, 1 to 6 percent slopes. This is a moderately deep, well drained, gently sloping soil on moderately broad to broad ridgetops of the Piedmont Plateau. Slopes are smooth and convex. Individual areas are 10 to several hundred acres in size.

Typically, the surface layer is brown sandy loam about 6 inches thick. The subsoil is yellowish red sandy clay loam to a depth of 11 inches, red clay to a depth of 23 inches, and red sandy clay loam to a depth of 33 inches. The underlying material is multicolored soft saprolite.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid throughout except for the surface layer where lime has been added. Permeability is moderate, and the available water capacity is low. The soil has fair to good tilth and can be worked within a moderately wide range of moisture content. The root zone is moderately deep and is easily penetrated by plant roots.

Included with this soil in mapping are areas of Pacolet soils that have a surface layer of gravelly sandy loam or gravelly loam and soils similar to Pacolet soils except that they also have a surface layer of gravelly sandy loam or gravelly loam. Also included are areas of Pacolet soils, on eroded knolls and side slopes, that have a surface layer of reddish brown or yellowish red sandy clay loam or clay loam and a few areas of Cecil, Gwinnett, and Toccoa soils. The included soils make up about 10 to 25 percent of this map unit, but the areas generally are less than 3 acres in size.

In some areas this soil is used for pasture and cultivated crops. It has good potential for pasture and hay and fair potential for cultivated crops. The low available water capacity and the small size and irregular shape of some of the areas are limitations to use of the soil as cropland. Tilth is easily maintained by returning crop residue to the soil. Erosion is a moderate hazard if crops are grown. Minimum tillage and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

This soil is used mainly as woodland. It has good potential for loblolly pine, slash pine, and yellow-poplar. There are no significant limitations to woodland use or management.

This soil has good potential for most urban uses. Low strength is a moderate limitation for roads and streets. The moderate permeability of the subsoil is a moderate limitation to use of the soil as septic tank absorption fields. These limitations can be partly overcome by proper design and installation.

This soil is in capability subclass IIe and in woodland group 3o.

32—Pacolet sandy loam, 6 to 10 percent slopes. This is a moderately deep, well drained, sloping soil on narrow ridgetops and side slopes of the Piedmont Plateau. Slopes are smooth to complex and convex. Individual areas are 15 to several hundred acres in size.

Typically, the surface layer is reddish brown sandy loam about 3 inches thick. The subsoil is yellowish red sandy clay loam to a depth of 7 inches, red clay to a depth of 26 inches, and red clay loam to a depth of 34 inches. The underlying material is mottled yellow, brown, and red soft saprolite.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid throughout except for the surface layer where lime has been added. Permeability is moderate, and the available water capacity is low. The soil has fair to good tilth and can be worked within a moderately wide range of moisture content. The root zone is deep and is easily penetrated by plant roots.

Included with this soil in mapping are areas of Pacolet soils and soils similar to Pacolet soils, both of which have a surface layer of gravelly sandy loam or gravelly loam. Also included are areas of Pacolet soils, on eroded knolls and side slopes, that have a surface layer of yellowish red sandy clay loam or clay loam and areas of Cecil, Cartecay, Gwinnett, and Toccoa soils. The included soils make up about 10 to 25 percent of this map unit, but the areas generally are less than 3 acres in size.

In some small areas this soil is used for pasture. It has good potential for pasture and hay. This soil has fair potential for cultivated crops. Slope, the low available water capacity, and the small size and irregular shape of some of the areas are limitations to use of the soil as cropland. Fair to good tilth can be maintained by returning crop residue to the soil. Erosion is a moderate to severe hazard if cultivated crops are grown. Minimum tillage and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

This soil is used mainly as woodland. It has good potential for loblolly pine, slash pine, and yellow-poplar. There are no significant limitations to woodland use or management.

This soil has fair potential for most urban uses. Slope is a moderate limitation that can be easily overcome by proper design and installation. Low strength is a moderate limitation for roads and streets. The moderate permeability of the subsoil is a moderate limitation to use of the soil as septic tank absorption fields. This limitation can be partly overcome by increasing the size of the absorption area or otherwise modifying the design of the filter field.

This soil is in capability subclass IIIe and in woodland group 3o.

33—Pacolet sandy loam, 10 to 15 percent slopes. This is a moderately deep, well drained, strongly sloping soil on narrow side slopes of the Piedmont Plateau. Slopes are smooth to complex and convex. Individual areas are 10 to 500 acres in size.

Typically, the surface layer is brown sandy loam about 6 inches thick. The subsoil is red clay; it extends to a depth of 29 inches. The underlying material is soft, highly weathered saprolite.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid throughout except for the surface layer where lime has been added. Permeability is moderate, and the available water capacity is low. The soil has fair to good tilth and can be worked within a moderately wide range of moisture content. The root zone is deep and is easily penetrated by plant roots.

Included with this soil in mapping are areas of Pacolet soils that have a surface layer of gravelly sandy loam or gravelly loam and areas of Pacolet soils, on eroded knolls and side slopes, that have a surface layer of yellowish red sandy clay loam or clay loam. Also included are a few areas of Cecil, Gwinnett, Cartecay, and Toccoa soils. The included soils make up about 5 to 25 percent of this map unit, but the areas generally are less than 5 acres in size.

In some small areas this soil is used for pasture. It has fair potential for pasture and hay. This soil has poor potential for cultivated crops. Slope, the low available water capacity, and the small size and irregular shape of some of the areas are limitations to use of the soil as cropland. Erosion is a severe hazard if cultivated crops are grown. Minimum tillage and the use of cover crops in the cropping system help reduce runoff and control erosion.

This soil is used mainly as woodland. It has good potential for loblolly pine, slash pine, and yellow-poplar. There are no significant limitations to woodland use or management.

This soil has fair potential for most urban uses. Slope is a moderate limitation for building site development, and low strength is a moderate limitation for roads and streets. These limitations can be overcome by proper design and installation. The moderate permeability of the subsoil is a moderate limitation to use of the soil as septic tank absorption fields. This limitation can be partly overcome by increasing the size of the absorption areas.

This soil is in capability subclass IVe and in woodland group 3o.

34—Pacolet-Urban land complex, 1 to 10 percent slopes. This complex consists of gently sloping to sloping, well drained Pacolet soils and Urban land. Individual areas range from about 100 to several hundred acres in size and are about 40 to 70 percent Pacolet soils and 20 to 45 percent Urban land. The Pacolet soils and Urban land are so intricately mixed that they could not be mapped separately at the scale selected for mapping.

Typically, Pacolet soils have a brown sandy loam surface layer about 6 inches thick. The subsoil is

yellowish red clay loam to a depth of 11 inches, red clay to a depth of 23 inches, and red sandy clay loam to a depth of 33 inches. The underlying material is highly weathered saprolite.

Urban land consists of areas where the soils have been altered to the extent that classification is not practical. In some areas the soil is covered by buildings, streets, sidewalks, driveways, and other structures. In other areas the soil has been significantly disturbed by cutting, filling, and grading. Because the soils have been covered or disturbed, runoff is rapid.

Included in mapping are areas of the similar Cecil soils and a few areas of Marvyn soils. Also included are small areas of well drained Toccoa soils in narrow drainageways and around drainage heads.

Pacolet soils are low in natural fertility and in content of organic matter. They are strongly or very strongly acid throughout except for the surface layer where lime has been added. Permeability is moderate, and the available water capacity is low.

Pacolet soils are used as building sites and for lawns, gardens, playgrounds, and parks (fig. 3). They have good to fair potential for most urban uses.

These soils are well suited to most locally grown plants; however, supplemental water is needed in dry periods. Erosion is not a serious problem except where the soil has been disturbed and left bare for an extended period.

Pacolet soils have good to fair potential for building site development. Slope is a slight to moderate limitation for most structures, but this limitation can be easily

Figure 3.—Pacolet-Urban land complex, 1 to 10 percent slopes, is used mainly as sites for houses and for gardens and parks.

overcome by proper design and construction. Low strength is an additional limitation for roads and streets. The moderately permeable subsoil is a limitation to use of the soil as septic tank absorption fields. This limitation can be partly overcome by increasing the size of the absorption field.

These soils are not assigned to a capability subclass or a woodland group.

35—Pits. This map unit consists of open excavations from which the soil and underlying material have been removed for use at another location. Soil pits, gravel pits, rock pits, and limestone quarries are included. Most of these areas are about 5 to 30 feet deep and 1 to 10 acres in size.

The largest area of Pits is near the Auburn-Opelika Airport and is about 180 acres in size. The next largest area is the Southern Stone Quarry, near Chewacla State Park, which is mined for agricultural limestone and construction rock. It is about 90 acres in size and about 100 feet deep.

The floor and walls of most pits are exposed geologic strata. This material supports little or no vegetation, although a few young pine trees are growing on the floor of some pits. In wet seasons some areas are ponded.

Pits have low potential for farm, urban, or woodland use. Most areas would require smoothing, shaping, and filling to be suitable for agricultural or urban use.

This unit is not assigned to a capability subclass or a woodland group.

36—Sacul loamy sand, 1 to 6 percent slopes. This is a deep, moderately well drained, gently sloping soil on moderately narrow ridgetops of the Coastal Plain. Slopes are smooth and convex. Individual areas are 7 to 250 acres in size.

Typically, the surface layer is yellowish brown loamy sand 8 inches thick. The subsoil is yellowish red clay to a depth of 16 inches, yellowish red clay with strong brown, red, and brownish yellow mottles to a depth of 26 inches, and mottled red, brownish yellow, light brownish gray, and strong brown sandy clay loam to a depth of 45 inches. The underlying material is stratified loamy and clayey marine sediment that is mottled with brownish yellow, light gray, and reddish brown; it extends to a depth of 60 inches or more.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid except for the surface layer where lime has been added. Permeability is slow, and the available water capacity is moderate. The soil has good tilth and can be worked within a moderate range of moisture content. The root zone is deep but is not easily penetrated by plant roots.

Included in mapping are a few areas of Cowarts, Marlboro, Marvyn, and Uchee soils and small areas of Kinston soils along narrow drainageways. The included soils make up about 5 to 15 percent of this map unit, but the areas generally are less than 5 acres in size.

In some areas this soil is used for pasture and as cropland. It has good potential for pasture and hay and fair potential for cultivated crops. Wetness often delays planting and interferes with tillage. Good tilth can be maintained by returning crop residue to the soil. Erosion is a moderate hazard if cultivated crops are grown. Minimum tillage and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

This soil is used mainly as woodland. It has good potential for loblolly pine and slash pine. There are no significant limitations to woodland use or management.

This soil has poor potential for most building site development. The low strength and high shrink-swell potential of the subsoil are severe limitations. The slow permeability of the subsoil is a severe limitation to use of the soil as septic tank absorption fields. These limitations are difficult to overcome.

This soil is in capability subclass IIIe and in woodland group 3c.

37—Sacul loamy sand, 6 to 10 percent slopes. This is a deep, moderately well drained, sloping soil on moderately narrow side slopes of the Coastal Plain. Slopes are smooth to complex and convex. Individual areas are 50 to several hundred acres in size.

Typically, the surface layer is yellowish brown loamy sand 5 inches thick. The subsoil extends to a depth of 54 inches. It is yellowish red clay in the upper part, mottled red, gray, and yellow clay in the middle part, and grayish brown clay loam with many red and yellow mottles in the lower part. The underlying material is stratified loamy and clayey marine sediment that is mottled gray and reddish brown; it extends to a depth of 65 inches or more.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid except for the surface layer where lime has been added. Permeability is slow, and the available water capacity is moderate. The soil has good tilth and can be worked within a moderate range of moisture content. The root zone is deep but is not easily penetrated by plant roots.

Included in mapping are a few areas of Cowarts and Uchee soils and small areas of Kinston soils along narrow drainageways. The included soils make up about 10 to 20 percent of this map unit, but the areas generally are less than 5 acres in size.

This soil has poor potential for cultivated crops. Slope is a limitation to use of the soil as cropland, and erosion is a severe hazard. Good tilth can be maintained by returning crop residue to the soil. The soil has good potential for pasture and hay.

This soil is used mainly as woodland. It has good potential for loblolly pine and slash pine. Erosion is a moderate concern in woodland management.

This soil has poor potential for building site development. The low strength and high shrink-swell potential of the subsoil are severe limitations. The slow

permeability of the subsoil is a severe limitation to use of the soil as septic tank absorption fields. These limitations are difficult to overcome.

This soil is in capability subclass IVe and in woodland group 3c.

38—Sacul silt loam, 1 to 4 percent slopes. This is a deep, moderately well drained, gently sloping soil on low, broad ridgetops of the Coastal Plain. Slopes are smooth and slightly convex. This soil is in one area about 1,000 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 2 inches thick. The subsurface layer is brown silt loam; it extends to a depth of 8 inches. The subsoil is reddish brown clay to a depth of 22 inches; reddish brown clay with common mottles of red and gray to a depth of 27 inches; mottled red, brown, and gray clay to a depth of 35 inches; mottled gray, red, and brown clay to a depth of 53 inches; and gray clay with red mottles to a depth of 59 inches. The underlying material is gray clay to a depth of 65 inches. It is light brownish gray sandy clay loam with yellowish brown, light yellowish brown, and dark reddish brown mottles to a depth of 85 inches or more.

This soil is low in natural fertility and in content of organic matter. It is very strongly acid or extremely acid except for the surface layer where lime has been added. Permeability is slow, and the available water capacity is high. The soil has fair to poor tilth and can be worked within only a moderate range of moisture content. The root zone is deep but is not easily penetrated by plant roots.

Included with this soil in mapping are a few areas of Marlboro and Marvyn soils and some areas of soils, along narrow drainageways, that are similar to Kinston soils. The included soils make up about 15 percent of this map unit but the areas generally are less than 3 acres in size.

In some areas this soil is used for pasture and as cropland. It has good potential for pasture and hay and fair potential for cultivated crops. The fair to poor tilth is a limitation to use of the soil as cropland. Wetness often delays planting and interferes with tillage. Good tilth is difficult to maintain, but tilth can be improved by returning crop residue to the soil. Erosion is a moderate hazard if cultivated crops are grown. Minimum tillage and the use of cover crops, including grasses and legumes, in the cropping system help reduce runoff and control erosion.

This soil is used mainly as woodland. It has good potential for loblolly pine and slash pine. There are no significant limitations to woodland use or management.

This soil has poor potential for most urban uses. The slow permeability, low strength, and high shrink-swell potential of the subsoil are severe limitations that are difficult to overcome.

This soil is in capability subclass IIIe and in woodland group 3c.

39—Toccoa sandy loam, 0 to 1 percent slopes. This is a deep, well drained, nearly level soil on narrow flood plains along streams and drainageways of the Piedmont Plateau. Individual areas are 10 to 485 acres in size.

Typically, the surface layer is brown sandy loam about 7 inches thick. The underlying material is brown sandy loam to a depth of 24 inches and mottled grayish brown and brown sandy loam to a depth of 45 inches. Below that it is mottled light brownish gray and yellowish brown sandy clay loam that extends to a depth of 58 inches or more.

This soil is low in natural fertility and in content of organic matter. It is slightly acid to strongly acid throughout except for the surface layer where lime has been added. Permeability is moderately rapid, and the available water capacity is low to moderate. The soil has good tilth and can be worked within a moderately wide range of moisture content. It is subject to frequent flooding for brief periods, generally in winter. The water table is at a depth of 2.5 to 5 feet from December to April. The root zone is deep and is easily penetrated by plant roots.

Included with this soil in mapping are a few areas of Cartecay and Enoree soils. Also included are a few areas of soils that are at a slightly higher elevation and have a subsoil of yellowish brown to yellowish red sandy clay loam. The included soils make up about 5 to 20 percent of this map unit, but the areas generally are less than 3 acres in size.

In some areas this soil is used for pasture and cultivated crops. It has good potential for pasture and hay and fair potential for cultivated crops. Good tilth is easily maintained by returning crop residue to the soil. The hazard of flooding and seasonal wetness are slight limitations to use of the soil as cropland.

This soil is used mainly as woodland. It has good potential for loblolly pine, American sycamore, cherrybark oak, and yellow-poplar. There are no significant limitations to woodland use or management.

This soil has poor potential for most urban uses. The hazard of flooding is a severe limitation that is difficult to overcome.

This soil is in capability subclass IIIw and in woodland group 1o.

40—Uchee loamy sand, 0 to 6 percent slopes. This is a deep, well drained, nearly level to gently sloping soil on broad ridgetops of the Coastal Plain. Slopes are smooth and convex. Individual areas are 10 to 2,100 acres in size.

Typically, the surface layer is dark grayish brown loamy sand about 6 inches thick. The subsurface layer is yellowish brown loamy sand that extends to a depth of 26 inches. The subsoil is yellowish brown sandy loam with light yellowish brown mottles to a depth of 32 inches, brownish yellow sandy clay loam with strong brown and very pale brown mottles to a depth of 39

inches, and brownish yellow clay with red and strong brown mottles to a depth of 47 inches. The underlying material is mottled strong brown, red, and very pale brown sandy clay loam with pockets of white clay to a depth of 66 inches. Below that, it is white loamy sand with pink mottles and pockets of yellowish red clay that extends to a depth of 84 inches or more.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid throughout except for the surface layer where lime has been added. Permeability is rapid in the surface and subsurface layers and moderate to moderately slow in the subsoil. The available water capacity is low to moderate. The soil has good tilth and can be worked within a wide range of moisture content. The root zone is deep and is easily penetrated by plant roots. This soil may have a water table perched above the substratum, generally in winter.

Included with this soil in mapping are areas of similar soils except that they have a surface layer of gravelly loamy sand. Also included are small pockets of gravelly soils and a few areas of Blanton, Cowarts, Kinston, Marvyn, and Orangeburg soils. The included soils make up about 5 to 20 percent of this map unit, but the areas generally are less than 3 acres in size.

This soil is used mainly for cultivated crops. However, it has only fair potential for cultivated crops. Droughtiness is a limitation. Good tilth is easily maintained. Erosion is a slight hazard.

In many areas this soil is used as woodland and for pasture. It has good potential for pasture and hay provided deep-rooting plants are grown (fig. 4). It has good potential for loblolly pine, slash pine, and longleaf pine. Because of the sandy texture, the seedling mortality rate is moderate, and the use of equipment is moderately restricted.

Figure 4.—Coastal bermudagrass in an area of Uchee loamy sandy, 0 to 6 percent slopes. This soil has good potential for use as pasture.

This soil has good potential for building site development. The perched water table and moderate shrink-swell potential of the subsoil are moderate limitations to use of the soil for dwellings with basements. Seasonal wetness and the moderately slow permeability in the lower part of the subsoil are severe limitations to use of the soil as septic tank absorption fields. The low to moderate available water capacity is a limitation to establishing and maintaining lawns and shrubs, but this limitation can be overcome by frequent applications of water during dry periods.

This soil is in capability subclass IIs and in woodland group 3s.

41—Uchee loamy sand, 6 to 10 percent slopes. This is a deep, well drained, sloping soil on narrow ridgetops and side slopes of the Coastal Plain. Slopes are mostly smooth and convex. Individual areas are 10 to 1,000 acres in size.

Typically, the surface layer is dark grayish brown loamy sand about 8 inches thick. The subsurface layer is yellowish brown and light yellowish brown loamy sand; it extends to a depth of 30 inches. The subsoil is light yellowish brown sandy loam to a depth of 41 inches and yellow heavy sandy clay loam with yellowish brown and light yellowish brown mottles to a depth of 55 inches. The underlying material is mottled yellow, brown, and red sandy loam and gray sandy clay or clay; it extends to a depth of 63 inches or more.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid throughout except for the surface layer where lime has been added. Permeability is rapid in the surface and subsurface layers and moderate to moderately slow in the subsoil. The available water capacity is low to moderate. The soil has good tilth and can be worked within a wide range of moisture content. The root zone is deep and is easily penetrated by plant roots. This soil may have a water table perched above the substratum, generally in winter.

Included with this soil in mapping are areas of Uchee soils that have a surface layer of gravelly loamy sand. Also included are small pockets of gravelly soils and a few areas of Blanton, Cowarts, Kinston, Marvyn, and Orangeburg soils. The included soils make up about 10 to 25 percent of this map unit, but the areas generally are less than 3 acres in size.

In many areas this soil is used for pasture and cultivated crops. It has good potential for pasture and hay provided deep-rooting plants are grown. It has fair potential for cultivated crops. Slope and droughtiness are limitations to use of the soil as cropland. Good tilth is easily maintained by returning crop residue to the soil. Erosion is a moderate hazard if cultivated crops are grown. Minimum tillage and the use of cover crops, including grasses and legumes, in the cropping system help control erosion.

This soil is used mainly as woodland. It has good potential for loblolly pine, slash pine, and longleaf pine. Because of the sandy texture, the seedling mortality rate is moderate, and the use of equipment is moderately restricted.

This soil has fair potential for most building site development. Slope is a moderate limitation for most structures, but this limitation can be easily overcome by proper design and construction. The perched water table and the moderate shrink-swell potential of the subsoil are limitations to use of the soil for dwellings with basements. Seasonal wetness and the moderately slow permeability in the lower part of the subsoil are severe limitations to use of the soil as septic tank absorption fields. The low to moderate available water capacity is a limitation to establishing and maintaining lawns and shrubs. This limitation can be overcome by frequent application of water during dry periods.

This soil is in capability subclass IIIs and in woodland group 3s.

42—Uchee loamy sand, 10 to 15 percent slopes. This is a deep, well drained, strongly sloping soil on dissected narrow side slopes of the Coastal Plain. Slopes are complex and convex. Individual areas are 10 to 100 acres in size.

Typically, the surface layer is dark grayish brown loamy sand about 7 inches thick. The subsurface layer extends to a depth of 33 inches; it is yellowish brown loamy sand in the upper part and light yellowish brown loamy sand in the lower part. The subsoil is brownish yellow sandy loam to a depth of 40 inches and brownish yellow heavy sandy clay loam with strong brown mottles to a depth of 48 inches. The underlying material is mottled yellow, red, and gray sandy loam; it extends to a depth of 65 inches or more.

This soil is low in natural fertility and in content of organic matter. It is strongly acid or very strongly acid throughout except for the surface layer where lime has been added. Permeability is rapid in the surface and subsurface layers and moderate to moderately slow in the subsoil. The available water capacity is low to moderate. The soil has good tilth and can be worked within a wide range of moisture content. The root zone is deep and is easily penetrated by plant roots. In wet seasons this soil has a water table perched above the substratum.

Included with this soil in mapping are areas of Uchee soils that have a surface layer of gravelly loamy sand. In most areas there are pockets of gravelly soils. In some places, there are few to common shallow gullies. Also included are a few areas of Blanton, Cowarts, Kinston, Marvyn, and Orangeburg soils. The included soils make up about 5 to 25 percent of this map unit, but the areas generally are less than 2 acres in size.

In some areas this soil is used for pasture and cultivated crops. It has good potential for hay and pasture provided deep-rooting plants are grown. It has poor potential for cultivated crops. Slope and droughtiness are limitations to use of the soil as

cropland. Good tilth is easily maintained by returning crop residue to the soil. Erosion is a moderate hazard if cultivated crops are grown. Minimum tillage and the use of cover crops, including grasses and legumes, in the cropping system help control erosion.

This soil is used mainly as woodland. It has good potential for loblolly pine, slash pine, and longleaf pine. Because of the sandy texture, the seedling mortality rate is moderate, and the use of equipment is moderately restricted.

This soil has fair potential for most building site development. Slope is a moderate limitation, but this limitation can be overcome by proper design and installation. The perched water table and the moderate shrink-swell potential of the subsoil are moderate limitations to use of the soil for dwellings with basements. Seasonal wetness and the moderately slow permeability in the lower part of the subsoil are severe limitations to use of the soil as septic tank absorption fields. The low to moderate available water capacity of the soil is a limitation to establishing and maintaining lawns and shrubs. This limitation can be overcome by frequent applications of water during dry periods.

This soil is in capability subclass IVs and in woodland group 3s.

43—Urban land. This map unit consists of extensively built-up land where 85 to 100 percent of the surface is covered by structures, asphalt, and concrete or has been disturbed by cutting and filling.

Most of these areas are gently sloping or sloping. Slopes range to 10 percent. Storm drains control runoff in the paved areas, and most of the unpaved areas are sodded.

Included in mapping are small areas of moderately built-up land where structures cover only 50 to 85 percent of the surface. Also included are remnants of undisturbed soils and areas where the surface layer has been removed by grading. The included areas make up as much as 15 percent of the map unit.

The soils in this unit have been so altered or obscured that they cannot be classified; they are not assigned to a capability subclass or a woodland group.

use and management of the soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

crops and pasture

Lewis D. Williams, conservation agronomist, Soil Conservation Service, helped write this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed soil map units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

In 1970, approximately 100,000 acres in the survey area were used for crops and pasture, according to the Alabama Conservation Needs Inventory (*1*). Of this total, 52,900 acres were used for permanent pasture and 47,000 acres for row crops. In 1975, the major cultivated crops harvested included 4,000 acres of corn, 6,265 acres of cotton, 870 acres of soybeans, and 680 acres of wheat. About 4,700 acres were harvested for hay.

Acreage in crops and pasture has gradually been decreasing as more and more land is used for urban development. In 1967, there were about 11,900 acres of urban and built-up land in the survey area, and this figure has been increasing at the rate of about 1,000 acres per year. Generally the soils that have good potential for crops also have good potential for urban development.

The soils in Lee County have fair potential for increased production of food and fiber. Only about 18,000 acres of potentially good cropland are currently used as pasture and woodland. However, food production can be increased considerably by applying the latest crop production technology to all of the land presently used for crops.

Erosion is the major concern on about two-thirds of the cropland and pasture in Lee County. If the slope is more than 2 percent, erosion is a potential hazard. Erosion is damaging for two reasons. First, productivity is reduced as the surface layer is lost and part of the subsoil is incorporated into the plow layer. Loss of the surface layer is especially damaging on soils that have a clayey subsoil, for example, Appling, Cecil, Gwinnett, and Sacul soils, and on soils that have a layer in or below the subsoil that limits the depth of the root zone, for example, Gwinnett and Pacolet soils. Second, soil erosion on farmland results in sedimentation of streams. Control of erosion minimizes the pollution of streams by sediment and improves the quality of water for municipal use, for recreation use, and for fish and wildlife.

Erosion can be controlled through practices that provide protective surface cover, reduce runoff, and increase infiltration. A cropping system that keeps

vegetative cover on the soil for an extended period helps reduce soil losses to an amount that does not reduce the productive capacity of the soils. On livestock farms, the legume and grass forage crops in the cropping system reduce erosion on sloping land, provide nitrogen, and improve tilth for the following crop.

Minimizing tillage and leaving crop residue on the surface help increase infiltration and reduce runoff. Most soils in the survey area are suited to these practices. No-tillage is effective in reducing erosion on sloping land and can be used on most soils in the county. Under-the-row subsoiling in addition to no-tillage is effective in preparing deep root beds on soils that have a traffic pan.

Terraces and diversions shorten slopes and reduce runoff. Most of the sloping soils that are used for cultivated crops are suited to terraces and diversions. Contour farming is also effective in reducing erosion on cropland. Soils that have smooth, uniform slopes are best suited to this practice. Most of the soils used for row crops are well suited to contour stripcropping.

Assistance in planning erosion control practices for each kind of soil is available at the office of the Lee County Soil and Water Conservation District.

Traffic pans are a concern on the soils of the Coastal Plain. The use of large tractors and heavy equipment results in compacted layers, generally at a depth of 2 to 12 inches. These layers restrict plant roots and infiltration of water. Cowarts, Marlboro, Marvyn, Orangeburg, and Uchee soils are among those most likely to have a traffic pan.

The amount of rainfall for crops commonly grown is adequate. However, the distribution of rainfall in spring and summer is such that periods of drought occur in most years, although prolonged droughts are rare. Irrigation is needed to reduce the possibility of drought. All of the soils commonly used for cultivated crops are suited to irrigation.

Drainage is needed on a few areas of soils used as cropland and pastureland. Most of these areas are of Cartecay, Enoree, and Kinston soils along streams. However, some drainage is also needed to remove water from small areas of ponded Toccoa soils.

Surface ditches are most commonly used in draining the soils. Underground tile is also used.

Most of the soils in Lee County are naturally acid. Natural fertility of most of the soils on uplands is low. The soils on flood plains, such as Enoree and Toccoa soils, are somewhat higher in content of plant nutrients than the soils on uplands.

All of the soils require applications of ground limestone to adjust the pH sufficiently for plants to fully benefit from commercial fertilizer. The content of available phosphorus and potassium is low in most soils. Crops on all of the soils respond well to lime and fertilizer. The amount of lime and fertilizer added to the soil should be based on the results of soil tests for the crops to be grown and the expected yield. The Cooperative Extension Service can help in determining the kind and amount of lime and fertilizer to apply.

Most of the soils in the survey area that are used for crops have either a sandy loam or loamy sand surface layer that is light in color and low in content of organic matter. The structure of such soils is generally weak, and intense rainfall causes a weak crust to form on the surface. The crust is hard when dry and somewhat impervious to water. Once the crust forms, it reduces infiltration and increases runoff. Regular additions of crop residue, manure, and other organic material can help improve soil structure and reduce crust formation.

The major cultivated field crops in the survey area are cotton and corn. Small acreages of soybeans and wheat are also grown. Cool-season annuals including rye, oats, ryegrass, arrowleaf clover, crimson clover, and vetch are grown for winter grazing and cover crops. The soils are suited to many crops that are not now commonly grown. Suitable crops include peanuts, potatoes, and melons and many other fruits and vegetables.

The only specialty crop currently grown in the survey area is improved turf grass for landscaping.

Pasture and hay crops are important in the survey area. Tall fescue, bahiagrass, common bermudagrass, and improved coastal bermudagrass are the major perennial grasses used as pasture and hay. White clover and tall fescue are usually planted together. Many of the soils are well suited to sericea and annual lespedeza.

Management practices needed on all soils used for hay and pasture include grazing and cutting at the proper height, weed control, proper fertilization, including use of manure, and rotation grazing. Tall fescue should not be grazed in summer so that the plants can store food reserves for fall and early spring growth. Restricting grazing and using sufficient fertilizer are the most important concerns in pasture production.

yields per acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green-manure crops; and harvesting that insures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils.

land capability classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor does it consider possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey. These levels are defined in the following paragraphs.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have slight limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

The acreage of soils in each capability class and subclass is shown in table 7. The capability classification of each map unit is given in the section "Detailed soil map units."

woodland management and productivity

Jerry L. Johnson, forester, Soil Conservation Service, helped write this section.

Commercial forest land makes up 67 percent or 264,000 acres of Lee County. Forest acreage decreased 2 percent from 1963 to 1972. This decrease was primarily the result of conversions to pastureland and urban use. Private individuals own approximately 90 percent of the forest land in Lee County, and businesses own approximately 8 percent. The rest is public forest land (*6*).

Forest types include 11,000 acres of longleaf-slash pine, 143,000 acres of loblolly-shortleaf pine, 44,000 acres of oak-pine, 44,000 acres of oak-hickory, and 22,000 acres of oak-gum cypress (*4*). Many acres of upland hardwoods could be converted to pine; most of these sites are well suited to pine. Yellow-poplar also grows well on many upland Piedmont soils.

The forests in Lee County are composed of 82,500 acres of sawtimber, 99,000 acres of poletimber, 77,000 acres of seedlings and saplings, and 5,500 acres of nonstocked areas. Nonstocked areas are less than 16.7 percent stocked with trees (*6*).

Most of the soils in the county have moderately high potential for tree crops. These soils generally have a site index of 80 or above for loblolly pine; less than 1 percent of the forest land has a site index of 70 or less.

There are two manufacturing plants in the county that use wood, and over 400 people are employed by the wood and lumber industry (*2*). Forest products make a significant contribution to the economy of Lee County.

Table 8 contains information useful to either woodland owners or forest managers. The table lists the ordination (woodland suitability) symbol for each soil. Soils assigned the same ordination symbol require similar

management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *w* indicates excessive water in or on the soil; *c*, clay in the upper part of the soil; *s*, sandy texture; and *r*, steep slopes. The letter *o* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: w, c, s, and r.

In table 8, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Ratings of the *erosion hazard* indicate the potential soil loss in woodland. The risk is *slight* if the potential soil loss is small, and *moderate* if measures are needed to control erosion during logging and road construction.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or in equipment; and *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree to which the soil affects the mortality of tree seedlings. Plant competition is not considered in the ratings. The ratings apply to seedlings from good stock that are properly planted during a period of sufficient rainfall. A rating of *slight* indicates that the expected mortality is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Ratings of *windthrow hazard* are based on soil characteristics that affect the development of tree roots and the ability of the soil to support trees firmly. A rating of *slight* indicates that trees in dense areas will not be blown down by strong winds and *moderate*, that some trees will be blown down during periods of excessive soil wetness and strong winds.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. Site index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. It was calculated at 30 years for eastern cottonwood, 35 years for American sycamore, and 50 years for all other species. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

Trees to plant are those that are suited to the soils and to commercial wood production.

recreation

Lee County has many areas of scenic, geologic, and historic interest that are used for camping, hiking, hunting, fishing, sightseeing, picnicking, and boating. Public lands available for recreation include Goat Rock Lake, Lake Harding, Lake Oliver, Chewacla State Park, and Loachapoka National Historical Site.

In the past several years use of these areas has increased greatly. Many of the soils in Lee County are well suited to development of recreation facilities. The soils that are best suited are those in map units 1 and 3, described in the section "General soil map units." These soils have hilly terrain, wooded slopes, and many streams, providing a variety of possible recreation uses.

The soils of the survey area are rated in table 9 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 9, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 9 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 12 and interpretations for dwellings without basements and for local roads and streets in table 11.

Camp areas require site preparation such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking, horseback riding, and bicycling should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

wildlife habitat

Robert E. Waters, biologist, Soil Conservation Service, helped write this section.

Soils affect the kinds and amounts of vegetation that are available to wildlife for food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be either created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 10, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges and sanctuaries, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. *Good* indicates that the element of wildlife habitat or habitat for the kind of wildlife is easily established, improved, or maintained. Few, if any, limitations affect management, and satisfactory results can be expected. *Fair* indicates that the element of wildlife habitat or habitat for the kind of wildlife can be created, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. *Poor* indicates that limitations are severe for the designated element of widlife habitat or habitat for the kind of wildlife. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. *Very poor* indicates that restrictions for the element of wildlife habitat or habitat for the kind of wildlife are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is either impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, soybeans, millets, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, bahiagrass, clovers, annual lespedezas, and vetches.

Wild herbaceous plants are either native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are dewberry, blackberry, crotons, partridge peas, bluestem, goldenrod, beggarweeds, crabgrass, and paspalums.

Hardwood trees and their woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect growth of hardwood trees and shrubs are depth of root zone, available water capacity, and wetness. Examples of these plants are oaks, yellow-poplar, cherry, sweetgum, apple, hawthorns, dogwood, hickory, viburnums, and hackberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are autumn-olive, pyracantha, and crabapple.

Coniferous plants furnish browse, seeds, and cones. Soil properties and features that affect growth of coniferous trees, shrubs, and ground cover are depth of root zone, available water capacity, and wetness. Examples of coniferous plants are pine, cypress, and cedar.

Wetland plants are either annual or perennial wild herbaceous plants that grow on moist or wet sites. Submerged and floating aquatic plants are not included. Soil properties and features affecting wetland plants are texture of surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are

smartweeds, wild millets, cattails, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines (fig. 5). These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include bobwhite quail, mourning dove, meadowlark, field sparrow, cottontail rabbit, and red fox.

Habitat for woodland wildlife consists of areas of either hardwood trees or coniferous plants or a mixture of both. Wildlife attracted to these areas include wild turkey, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, deer, and vireos.

Habitat for wetland wildlife consists of swampy, marshy, or open water areas. Wildlife attracted to such areas include ducks, geese, shore birds, muskrat, mink, and beaver.

engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are

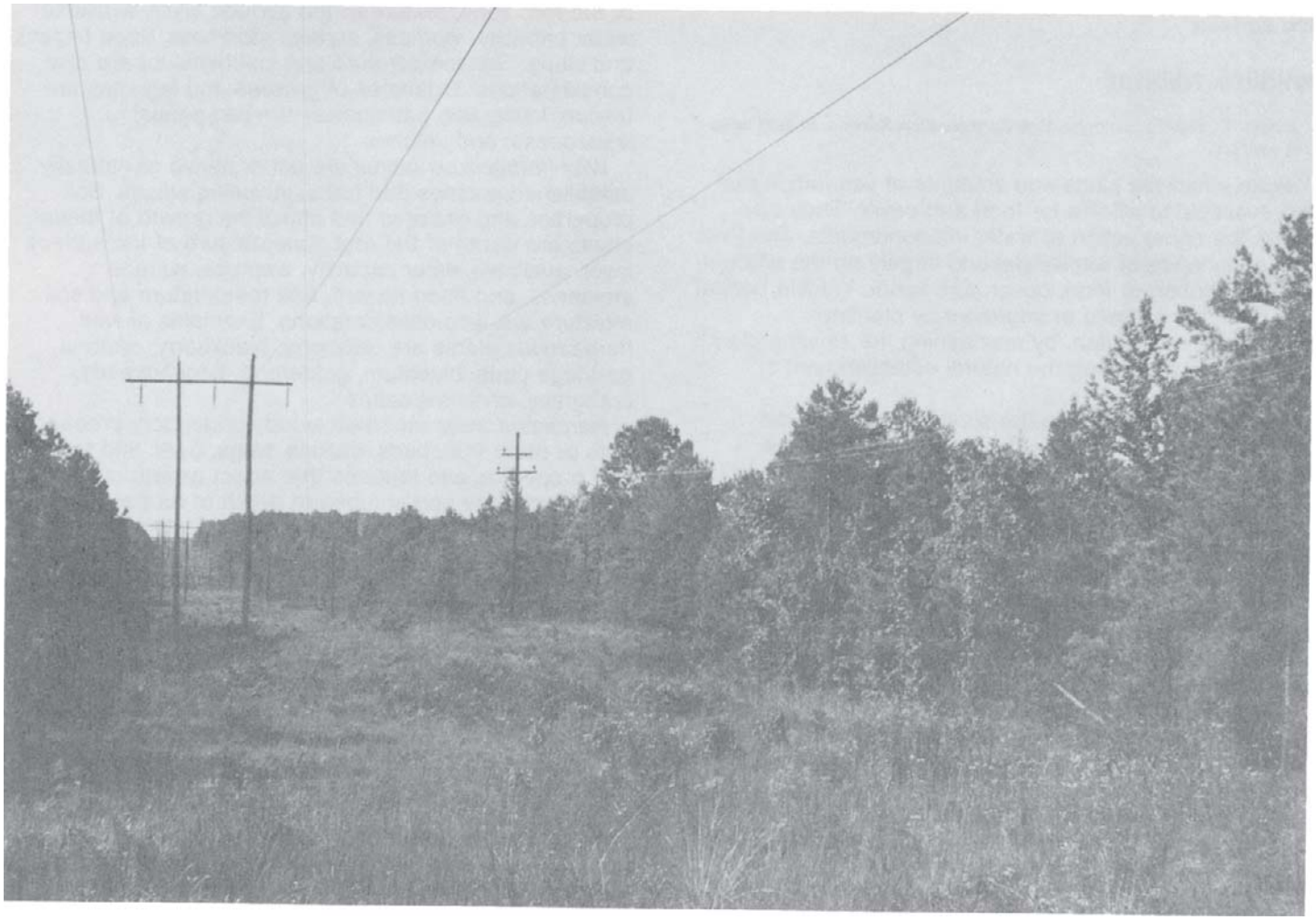


Figure 5.—A power transmission line right-of-way is an ideal site to develop as food plots for wildlife. Pacolet sandy loam, 6 to 10 percent slopes, has good potential for this use.

given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations need to be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

building site development

Table 11 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, and shrink-swell potential can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, and depth to a high water table affect the traffic supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand or clay in the surface layer affect trafficability after vegetation is established.

sanitary facilities

Table 12 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 12 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to effectively filter the effluent. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 12 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 12 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture and stones and boulders, affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

construction materials

Table 13 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a probable or improbable source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by flooding, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 13, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

water management

Table 14 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; and susceptibility to flooding. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. Availability of drainage outlets is not considered in the ratings.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

soil properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 18.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

engineering index properties

Table 15 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil series and their morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Sandy clay loam," for example, is soil that is 20 to 35 percent clay, less than 28 percent silt, and 45 percent more sand. If a soil contains particles coarser than sand, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (*4*) and the system adopted by the American Association of State Highway and Transportation Officials (*3*).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 18.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5

percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

physical and chemical properties

Table 16 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earth-moving operations.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

soil and water features

Table 17 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt and water in swamps and marshes are not considered flooding.

Table 17 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, occasional, and frequent. *None* means that flooding is not probable; *occasional* that it occurs on an average of once or less in 2 years; and *frequent* that it occurs on an average of more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 17 are the depth to the seasonal high water table; the kind of water table—that is, perched or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 17.

An apparent water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A perched water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as hard if applicable. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture and acidity, of the saturation extract.

physical and chemical analyses of selected soils

The results of physical analysis of several typical pedons in the survey area are given in table 20 and the results of chemical analysis in table 19. The data are for soils sampled at carefully selected sites. The pedons are typical of the series and are described in the section "Soil series and their morphology." Soil samples were analyzed by the Agronomy and Soils Minerology Laboratory, Auburn University.

Most determinations were made on soil material smaller than 2 millimeters in diameter. Measurements reported as percent or quantity of unit weight were calculated on an ovendry basis. The methods used in obtaining the data are indicated in the list that follows. The codes in parentheses refer to published methods (*5*). Extractable bases and base saturation were determined after the method of Hajek, Adams, and Cope (*5*).

Sand—(0.05-2.0 mm fraction) weight percentages of materials less than 2 mm (3A1).

Silt—(0.002-0.05 mm fraction) pipette extraction, weight percentages of all materials less than 2 mm (3A1).

Clay—(fraction less than 0.002 mm) pipette extraction, weight percentages of materials less than 2 mm (3A1).

Reaction (pH)—1:1 water dilution (8C1a).

engineering index test data

Table 18 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are typical of the series and are described in the section "Soil series and their morphology." The soil samples were tested by State of Alabama, Highway Department Soils Laboratory.

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

The tests and methods are: AASHTO classification—M 145 (AASHTO); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO); Liquid limit—T 89 (AASHTO); Plasticity index—T 90 (AASHTO); Moisture density, Method A—T 99 (AASHTO).

classification of the soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*8*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. In table 21, the soils of the survey area are classified according to the system. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Ultisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udult (*Ud*, meaning Humid, plus *Ult*, from Ultisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludults (*Hapl*, meaning minimal horizonation, plus *udults*, the suborder of the Ultisols that have an udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Hapludults.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is clayey, kaolinitic, thermic Typic Hapludults.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

soil series and their morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the Soil Survey Manual (*7*). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (*8*). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed soil map units."

Appling series

The Appling series consists of deep, well drained, moderately permeable soils that formed in residuum of granite, gneiss, and schist. These soils are gently sloping to sloping and are on uplands of the Piedmont Plateau. Slopes are dominantly 1 to 6 percent but range up to 10 percent.

Appling soils are on the same landscape as the well drained Cecil, Durham, and Pacolet soils. Cecil soils have a redder argillic horizon. Durham soils have a fine-loamy control section. Pacolet soils have a thinner solum.

Typical pedon of Appling sandy loam, 1 to 6 percent slopes, in an idle field about 3.5 miles south of Opelika,

2,600 feet east and 1,400 feet north of the southwest corner of sec. 29, T. 19 N., R. 27 E.

Ap—0 to 8 inches; brown (10YR 5/3) sandy loam; weak fine granular structure; very friable; few to common fine roots; 5 percent angular fragments; strongly acid; abrupt smooth boundary.
B1—8 to 11 inches; brownish yellow (10YR 6/6) sandy clay loam; weak medium subangular blocky structure; friable; few fine roots; strongly acid; clear smooth boundary.
B21t—11 to 20 inches; strong brown (7.5YR 5/8) clay; moderate medium subangular blocky structure; firm; thin discontinuous clay films on faces of most peds; strongly acid; clear smooth boundary.
B22t—20 to 35 inches; brownish yellow (10YR 6/8) clay; common medium distinct yellow (10YR 7/6) and yellowish red (5YR 5/6) mottles; moderate medium subangular blocky structure; firm; few to common fine flakes of mica; thin discontinuous clay films on faces of peds; strongly acid; gradual wavy boundary.
B3—35 to 54 inches; reddish yellow (5YR 6/8) clay loam; common fine distinct yellow (10YR 7/6) and yellowish brown (10YR 5/6) mottles; weak fine and medium subangular blocky structure; friable; common to many fine flakes of mica; few thin lenses of soft saprolite; very strongly acid; gradual wavy boundary.
C—54 to 60 inches; reddish yellow (5YR 6/8) soft saprolite that crushes to loam; thin lenses of clay; common fine distinct yellow (10YR 7/6) and yellowish red (5YR 4/6) mottles; massive; friable; very strongly acid.

The solum is 42 to 60 inches thick. The soil is strongly acid to very strongly acid except where lime has been added. Depth to hard rock is more than 6 feet.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3 or value of 5 and chroma of 4.

The B1 horizon has hue of 10YR through 5YR, value of 4 through 6, and chroma of 4 or 6. It is sandy clay loam or sandy loam.

The B2t horizon has hue of 5YR through 2.5Y, value of 4 through 6, and chroma of 4 through 8. It is clay or clay loam. The upper part of the B2t horizon is 35 to 58 percent clay and 15 to 30 percent silt. Common to many yellow, brown, and red mottles are in the lower part, or the horizon may be mottled with these colors.

The B3 horizon is similar in color to the B2t horizon or is mottled in hue of 2.5Y through 5YR, value of 4 through 7, and chroma of 3 through 8. It is clay loam or loam.

The C horizon is multicolored soft saprolite that has rock-controlled structure and crushes to loam or sandy loam. In many places there are thin lenses of clay or clay loam in the upper 10 to 20 inches.

Blanton series

The Blanton series consists of deep, moderately well drained, moderately permeable soils. These soils formed in thick beds of sandy and loamy marine deposits. They are gently sloping to sloping and are on uplands of the Coastal Plain. Slope ranges from 0 to 10 percent.

Blanton soils are on the same landscape as Cowarts, Marvyn, and Uchee soils. The well drained to moderately well drained Cowarts soils and the well drained Marvyn soils have an A horizon that is less than 20 inches thick. Uchee soils are well drained and have an A horizon that is 20 to 40 inches thick.

Typical pedon of Blanton loamy sand, 0 to 5 percent slopes, in a wooded area about 5 miles west of Phenix City, 2,200 feet south and 400 feet west of the northeast corner of sec. 11, T. 17 N., R. 29 E.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) loamy sand; single grained; very friable to loose; many fine and medium roots; strongly acid; abrupt smooth boundary.
A21—9 to 32 inches; yellowish brown (10YR 5/4) loamy sand; single grained; very friable to loose; few fine and medium roots; strongly acid; clear smooth boundary.
A22—32 to 48 inches; yellowish brown (10YR 5/6) loamy sand, few pockets of brownish yellow (10YR 6/6); weak fine and medium subangular blocky structure; friable; slightly brittle in about 30 percent of mass, ruptures with slight pressure; few fine roots; sand grains coated with clay; very strongly acid; gradual smooth boundary.
B1—48 to 56 inches; very pale brown (10YR 7/4) sandy loam; common fine distinct yellowish brown (10YR 5/6) mottles; pockets of clean sand grains; weak medium platy structure parting to weak medium subangular blocky; friable, compact in place; brittle in about 20 percent of mass; sand grains bridged and coated with clay; 10 to 15 percent rounded gravel as much as 2 inches in diameter; strongly acid; abrupt smooth boundary.
B2t—56 to 67 inches; equally mottled yellowish brown (10YR 5/6) and brownish yellow (10YR 6/8) sandy clay loam; many medium distinct light gray (10YR 7/2) mottles; weak medium subangular blocky structure; friable; 5 percent rounded gravel less than 1 inch in diameter; sand grains bridged and coated with clay; few patchy clay films on faces of peds; strongly acid; clear smooth boundary.
C1—67 to 86 inches; mottled yellowish brown (10YR 5/6), brownish yellow (10YR 6/8) and red (2.5YR 4/8) sandy loam and light gray (10YR 7/2) clay; massive and compact in place; thick clay films in some pores and around pebbles; 2 percent rounded gravel less than one-half inch in diameter; few to common fine flakes of mica; strongly acid; abrupt smooth boundary.

IIC2—86 to 99 inches; red (2.5YR 4/8) sandy clay loam; common medium prominent mottles of reddish yellow (7.5YR 6/8); massive; friable; many fine to medium flakes of mica; very strongly acid.

The solum is 65 to 80 or more inches thick. The soil is strongly acid or very strongly acid throughout, except where lime has been added. Content of fragments is generally less than 15 percent.

The Ap horizon is 6 to 10 inches thick. It has hue of 10YR, value of 3 through 6, and chroma of 2 or 3.

The A2 horizon is 47 to 70 inches thick. It has hue of 10YR, value of 5 through 7, and chroma of 3 through 6. Texture of the A2 horizon is loamy sand or sand.

The B1 horizon, where present, has hue of 10YR, value of 6 or 7, and chroma of 3 or 4.

The Bt horizon has hue of 10YR or 7.5YR, value of 5 through 7, and chroma of 4 through 8. In the lower part, in many places, there are a few to common mottles in shades of yellow, brown, red, or gray. In some pedons the lower part of this horizon does not have a matrix color; it is mottled yellow, brown, red, and gray. The Bt horizon is sandy clay loam or sandy loam. In some pedons the lower part of the horizon is sandy clay.

The C horizon is mottled yellow, brown, red, and gray. Mica flakes are few to common. In most places the C horizon is sandy loam, sandy clay loam, or sandy clay. The soil is stratified in most pedons.

Blanton soils in Lee County differ from the soils of the Blanton series in that the solum is typically 5 to 15 percent coarse fragments and is slightly brittle in about 20 to 30 percent of the mass in the lower part of the A horizon and the upper part of the Bt horizon. Also, the liquid limit and the plasticity index for the lower part of the Bt horizon are higher in value than is typical for the Blanton series.

Cartecay series

The Cartecay series consists of deep, somewhat poorly drained, moderately rapidly permeable soils that formed in alluvium along streams and drainageways. These soils are nearly level and are on flood plains of the Piedmont Plateau. Slopes are dominantly 0 to 1 percent.

Cartecay soils are on the same landscape as Enoree and Toccoa soils. Enoree soils are poorly drained. Toccoa soils are well drained and have a coarse-loamy control section.

Typical pedon of Cartecay silt loam, 0 to 1 percent slopes, in a pasture 0.9 mile north of Salem, 2,000 feet south and 1,500 feet west of the northeast corner of sec. 28, T. 19 N., R. 28 E.

A11—0 to 3 inches; dark brown (10YR 3/3) silt loam; weak fine granular structure; very friable; many fine roots; common fine flakes of mica; medium acid; abrupt smooth boundary.

A12—3 to 7 inches; dark yellowish brown (10YR 4/4) fine sandy loam; common fine prominent reddish brown (5YR 5/4) mottles; weak fine granular structure; very friable; common fine roots; common fine flakes of mica; medium acid; abrupt smooth boundary.

C1—7 to 18 inches; brown (10YR 5/3) loam; common fine distinct strong brown (7.5YR 5/6) and dark reddish brown (5YR 3/3) mottles; massive; friable; few thin lenses of loamy sand; few fine roots; common to many fine flakes of mica; medium acid; clear smooth boundary.

C2—18 to 33 inches; mottled brown (7.5YR 4/4), reddish brown (5YR 4/4), and grayish brown (10YR 5/2) silt loam; massive; friable; many fine flakes of mica; strongly acid; clear smooth boundary.

C3g—33 to 37 inches; grayish brown (10YR 5/2) silt loam, common fine prominent reddish brown mottles; massive; friable; lenses of sandy loam; common fine flakes of mica; strongly acid; clear wavy boundary.

C4g—37 to 58 inches; grayish brown (10YR 5/2) loamy sand; massive; loose; thin lenses of silt loam; few fine flakes of mica; medium acid; abrupt wavy boundary.

Abg—58 to 65 inches; very dark gray (N 3/0) silt loam; massive; friable; thin lenses of sandy loam; common fine flakes of mica; strongly acid.

The soil is slightly acid to strongly acid. There are thin strata of contrasting textures throughout the soil and few to many mica flakes in all horizons.

The A horizon has hue of 10YR through 5YR, value of 4 or 5, and chroma of 2 through 4 or value of 3 and chroma of 3 or 4.

The C1 and C2 horizons have hue of 10YR through 5YR, value of 4 through 6, and chroma of 2 through 6. They are silt loam, loam, or sandy loam and have thin strata of silt loam, loam, sandy loam, and loamy sand.

The Cg horizon has hue of 10YR, value of 4 through 6, and chroma of 1 or 2. It is silt loam, loam, or sandy loam.

There is commonly a buried horizon at a depth of more than 20 to 30 inches. The color and texture of this horizon are similar to those of the Cg horizon. Occasionally, there are strata of gravel at a depth of more than 40 inches.

Cecil series

The Cecil series consists of deep, well drained, moderately permeable soils that formed in residuum of granite, gneiss, and schist. These soils are gently sloping to steep and are on uplands of the Piedmont Plateau. Slope ranges from 1 to 25 percent.

Cecil soils are on the same landscape as the well drained Appling, Durham, and Pacolet soils. Appling soils have a yellow argillic horizon. Durham soils have a fine-

loamy control section. Pacolet soils have a thinner solum and a generally higher content of mica.

Typical pedon of Cecil sandy loam, 1 to 6 percent slopes, in a pine forest 2 miles northeast of Salem, 2,500 feet south and 1,800 feet west of the northeast corner of sec. 22, T. 19 N., R. 28 E.

Ap—0 to 4 inches; reddish brown (5YR 4/4) sandy loam; weak fine and medium granular structure; very friable, hard; common fine and medium roots; few fine pebbles; very strongly acid; abrupt smooth boundary.

B1—4 to 7 inches; red (2.5YR 4/6) clay loam; moderate fine and medium subangular blocky structure; firm, hard; common fine and medium roots; few fine pebbles; thick patchy clay films on faces of peds; very strongly acid; clear wavy boundary.

B21t—7 to 26 inches; red (2.5YR 4/8) clay; moderate fine and medium subangular blocky structure; firm, very hard; few fine and medium roots; common fine pores; few soft masses of saprolite; thick continuous clay films on faces of peds; strongly acid; gradual wavy boundary.

B22t—26 to 48 inches; red (2.5YR 4/6) clay; weak fine and medium subangular blocky structure; firm, hard; few to medium roots; common fine pores; common pockets and lenses of strong brown (7.5YR 5/6) saprolite; thick patchy clay films on faces of most peds; very strongly acid; gradual wavy boundary.

B3—48 to 60 inches; red (2.5YR 4/6) sandy clay loam; weak fine and medium subangular blocky structure; friable, hard; common fine pores; many pockets and lenses of strong brown (7.5YR 5/6) saprolite; thin patchy clay films on faces of most peds; strongly acid; gradual wavy boundary.

C—60 to 70 inches; red (2.5YR 4/6), reddish brown (5YR 4/4), and strong brown (7.5YR 5/6) saprolite; massive; crushes to sandy loam; common vertical lenses of red (10R 5/6) sandy clay loam; very strongly acid.

The solum is 42 to 60 or more inches thick. The soil is strongly to very strongly acid except where lime has been added. Depth to hard rock is more than 6 feet.

The A horizon has hue of 10YR through 5YR, value of 4 or 5, and chroma of 2 through 4. It is sandy loam or cobbly loam.

The B1 horizon has hue of 5YR or 2.5YR, value of 4, and chroma of 6 or 8. It is clay loam or sandy clay loam.

The B2t horizon has hue of 2.5YR or 10R, value of 4 or 5, and chroma of 6 or 8. In some pedons, the lower part is mottled in shades of brown or yellow. Texture of the B2t horizon is clay or clay loam.

The B3 horizon has hue of 2.5YR or 10R, value of 4 or 5, and chroma of 6 or 8. Mottles are in shades of red, brown, and yellow. Texture of the B3 horizon is clay loam or sandy clay loam.

The C horizon is multicolored, soft, highly weathered saprolite that is very friable and crushes to sandy loam or loam.

Cowarts series

The Cowarts series consists of deep, well drained to moderately well drained soils that formed in medium textured marine deposits. These soils are moderately to moderately slowly permeable in the solum and moderately slowly to slowly permeable in the substratum. They are gently sloping to strongly sloping and are on uplands of the Coastal Plain. Slopes are dominantly 2 to 10 percent but are as much as 15 percent.

Cowarts soils are on the same landscape as Blanton, Marvyn, and Uchee soils. Blanton soils are moderately well drained and have a sandy A horizon more than 40 inches thick. Marvyn soils are well drained and have a solum more than 40 inches thick. Uchee soils are well drained and have a sandy A horizon 20 to 40 inches thick.

Typical pedon of Cowarts loamy sand, 2 to 6 percent slopes, in a pasture area 0.6 mile north of Marvyn and 2,500 feet south and 500 feet west of the northeast corner of sec. 19, T. 17 N., R. 27 E.

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) loamy sand; weak fine granular structure; very friable; many fine roots; medium acid; abrupt smooth boundary.

A2—5 to 15 inches; yellowish brown (10YR 5/4) sandy loam; weak fine granular structure; very friable; common fine roots; 5 to 10 percent rounded gravel less than 1 inch in diameter; medium acid; abrupt smooth boundary.

B1—15 to 20 inches; yellowish brown (10YR 5/6) sandy loam; weak medium subangular blocky structure; friable; few fine roots; 5 to 10 percent rounded gravel less than 1 inch in diameter; thin patchy clay films on faces of peds; strongly acid; clear smooth boundary.

B21t—20 to 25 inches; brownish yellow (10YR 6/6) sandy clay loam; common medium distinct strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable; few fine roots; 3 to 5 percent rounded gravel less than 1 inch in diameter; thin patchy clay films on faces of peds; strongly acid; clear smooth boundary.

B22t—25 to 34 inches; mottled yellowish brown (10YR 5/6), very pale brown (10YR 7/3), and red (2.5YR 4/6) sandy clay loam; weak medium subangular blocky structure; firm; thin patchy clay films on faces of peds; thick continuous clay films around roots and pebbles; few medium flakes of mica; strongly acid; clear smooth boundary.

C1—34 to 44 inches; mottled red (2.5YR 4/8) and reddish yellow (7.5YR 6/8) sandy loam and light gray (10YR 7/2) clay; massive; firm; thin patchy clay films; very strongly acid; gradual smooth boundary.

C2—44 to 59 inches; mottled red (2.5YR 4/6) and brownish yellow (10YR 6/8) sandy clay loam and light gray (10YR 7/l) clay; common medium prominent dark brown (10YR 4/3) mottles; massive; sandy clay loam is friable, clay is very firm and plastic; common fine flakes of mica; very strongly acid; abrupt smooth boundary.

IIC3—59 to 80 inches; mottled white (10YR 8/1), red (2.5YR 4/8), brownish yellow (10YR 6/8), and very pale brown (10YR 7/4) sandy loam; massive; friable; common fine flakes of mica; few vertical tongues of gray (10YR 5/1) clay 2 to 5 inches wide bounded by red (2.5YR 4/6) sandy loam 2 to 3 inches wide; very strongly acid.

The solum is 26 to 40 inches thick. The soil is strongly acid or very strongly acid throughout except where lime has been added. Depth to rock is more than 6 feet. Mica flakes are few in the upper horizons and common or many in the lower horizons.

The Ap horizon has hue of 2.5Y or 10YR, value of 4 or 5, and chroma of 2 through 4. Content of rounded gravel is as much as 15 percent.

The A2 horizon has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. It is sandy loam or loamy sand.

The B2t horizon has hue of 10YR through 5YR, value of 5 or 6, and chroma of 4 through 8. In the lower part mottles are in shades of red, yellow, and brown. Texture of the B2t horizon is sandy clay loam, clay loam, or sandy clay.

The C horizon is mottled and has hue of 10YR through 10R, value of 4 through 8, and chroma of 1 through 8. Its average texture is sandy loam or sandy clay loam; there are pockets of finer material in some pedons.

Durham series

The Durham series consists of deep, well drained, moderately permeable soils that formed in residuum of granite, gneiss, and schist. These soils are gently sloping and are on uplands of the Piedmont Plateau. Slopes are dominantly 1 to 6 percent but may be as much as 10 percent.

Durham soils are on the same landscape as the well drained Appling, Cecil, and Pacolet soils. Appling soils have a clayey control section. Cecil soils have a redder argillic horizon. Pacolet soils have a thinner solum, redder hue, and a generally higher content of mica.

Typical pedon of Durham sandy loam, 1 to 6 percent slopes, in a pine forest 3 miles northeast of Opelika, 1,800 feet east and 700 feet south of the northwest corner of sec. 33, T. 20 N., R. 27 E.

Ap—0 to 6 inches; brown (10YR 4/3) sandy loam; weak medium granular structure; very friable; common fine roots; 3 to 4 percent angular fragments less than 1 inch in diameter; medium acid; abrupt smooth boundary.

B1—6 to 10 inches; yellowish brown (10YR 5/4) sandy loam; weak fine subangular blocky structure; friable; few fine roots; thin patchy clay films on faces of peds; strongly acid; clear smooth boundary.

B21t—10 to 23 inches; yellowish brown (10YR 5/6) sandy clay loam; moderate medium subangular blocky structure; friable; thin discontinuous clay film on faces of peds; strongly acid; clear smooth boundary.

B22t—23 to 36 inches; yellowish brown (10YR 5/8) clay loam; common medium prominent yellowish red (5YR 4/6) and red (2.5YR 4/6) mottles; moderate medium subangular blocky structure; friable; thin discontinuous clay film on faces of peds; strongly acid; gradual wavy boundary.

B3—36 to 59 inches; mottled yellowish brown (10YR 5/6), yellowish red (5YR 4/6), red (2.5YR 4/6), yellow (10YR 7/6), and light brownish gray (10YR 6/2) clay loam; moderate medium subangular blocky structure; friable; thin discontinuous clay film on faces of peds; few fine flakes of mica; strongly acid; gradual wavy boundary.

C—59 to 85 inches; mottled brownish yellow (10YR 6/6), light brownish gray (10YR 6/2), and red (2.5YR 4/6) sandy loam that has thin lenses of clay; massive; very friable; common to many fine flakes of mica; strongly acid.

The solum is 42 to 60 inches thick. The soil is strongly acid to very strongly acid except where lime has been added. Depth to hard rock is more than 5 feet.

The Ap horizon has hue of 2.5Y or 10YR, value of 4 through 6, and chroma of 2 or 3.

The B1 horizon has hue of 2.5Y or 10YR, value of 5, and chroma of 4. It is sandy loam or sandy clay loam.

The B2t horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 6 or 8 or hue of 2.5Y, value of 7 or 8, and chroma of 6. In the lower part mottles are in shades of yellow, brown, or red. Mica flakes are none to common. Texture of the B2t horizon is sandy loam, sandy clay loam, or clay loam.

The B3 horizon is mottled and has hue of 10YR through 2.5YR, value of 4 through 7, and chroma of 2 through 6. Mica flakes are few to common. Texture of the B3 horizon is sandy clay loam or clay loam.

The C horizon is multicolored, soft saprolite that is very friable and crushes to sandy loam or loam. Mica flakes are common to many.

Enoree series

The Enoree series consists of deep, poorly drained, moderately permeable soils that formed in alluvium along streams and drainageways. These soils are nearly level and are on narrow flood plains of the Piedmont Plateau. Slopes are dominantly 0 to 1 percent.

Enoree soils are on the same landscape as Cartecay, Kinston, and Toccoa soils. Cartecay soils are somewhat

poorly drained. Kinston soils are poorly drained and have siliceous mineralogy. Toccoa soils are well drained.

Typical pedon of Enoree silt loam, 0 to 1 percent slopes, in a wooded area 3.25 miles north of Opelika, 1,900 feet north and 600 feet west of the southeast corner of sec. 25, T. 20 N., R. 26 E.

A1—0 to 9 inches; mottled yellowish brown (10YR 5/6), strong brown (7.5YR 5/6), pale brown (10YR 6/3), and reddish brown (5YR 4/4) silt loam; massive; very friable; medium acid; abrupt wavy boundary.

C1g—9 to 18 inches; gray (10YR 5/1) silt loam; common medium distinct brown (10YR 5/3) mottles; weak fine granular structure; friable; few to common fine roots; many fine flakes of mica; medium acid; gradual smooth boundary.

C2g—18 to 30 inches; mottled dark grayish brown (10YR 4/2) and dark brown (7.5YR 4/4) silt loam; massive; friable; many fine roots; many fine flakes of mica; strongly acid; clear wavy boundary.

C3g—30 to 42 inches; grayish brown (10YR 5/2) silt loam; many coarse distinct dark brown (7.5YR 4/4) mottles; massive; friable; few fine roots; common fine flakes of mica; medium acid; gradual wavy boundary.

B21bg—42 to 52 inches; gray (10YR 5/1) silty clay loam; common medium prominent yellowish brown (10YR 5/4) mottles; weak fine subangular blocky structure; firm; common fine flakes of mica; strongly acid; gradual wavy boundary.

B22bg—52 to 60 inches; gray (N 5/0) silty clay loam; common medium distinct strong brown (7.5YR 5/6) and brownish yellow (10YR 6/6) mottles; weak fine subangular blocky structure; firm; common fine flakes of mica; strongly acid.

The soil is slightly acid to strongly acid. It has thin strata of contrasting textures throughout the soil and few to many mica flakes in all horizons below the A horizon.

The A horizon has hue of 10YR through 5YR, value of 4 through 6, and chroma of 2 through 6.

The C horizon has hue of 10YR through 5YR, value of 4 or 5, and chroma of 1 through 4. It is silt loam, loam, or sandy loam.

In most pedons there is a buried B horizon at a depth of more than 35 inches. This horizon has hue of 10YR or is neutral and has value of 4 through 6 and chroma of 1. Mottles are in shades of yellow or brown. Texture of the buried horizon is silt loam, silty clay loam, or sandy clay loam.

Gwinnett series

The Gwinnett series consists of moderately deep, well drained, moderately permeable soils that formed in residuum of hornblende, schist, and gneiss. These soils are gently sloping to strongly sloping and are on uplands of the Piedmont Plateau. Slope ranges from 1 to 15 percent.

Gwinnett soils are on the same landscape as the well drained Cecil, Hiwassee, and Pacolet soils. Cecil soils have a Bt horizon that has higher color value. Cecil and Hiwassee soils have a thicker solum. Pacolet soils have higher color value throughout.

Typical pedon of Gwinnett sandy loam, 6 to 10 percent slopes, in a wooded area 10 miles northwest of Opelika, 1,600 feet north and 600 feet east of the southwest corner of sec. 22, T. 20 N., R. 25 E.

Ap—0 to 4 inches; dark reddish brown (2.5YR 3/4) sandy loam; moderate medium granular structure; friable; common fine roots; 10 percent angular fragments less than 3 inches in diameter; strongly acid; abrupt smooth boundary.

B2t—4 to 25 inches; dark red (2.5YR 3/6) clay; moderate medium subangular blocky structure; firm; thin patchy clay films on faces of peds; strongly acid; clear irregular boundary.

Cr—25 to 40 inches; soft highly weathered hornblende schist; few thin lenses of material from the Bt horizon; rock-controlled structure.

The solum is 20 to 40 inches thick. The soil is medium acid to strongly acid. Depth to hard rock is more than 5 feet. The content of angular fragments is as much as 15 percent.

The Ap horizon has hue of 5YR through 10R, value of 2 or 3, and chroma of 3 through 6.

The B2t horizon has hue of 2.5YR or 10R, value of 3, and chroma of 4 or 6. It is clay or clay loam.

The C horizon is multicolored, soft saprolite that often has thin lenses of material from the Bt horizon.

Hiwassee series

The Hiwassee series consists of deep, well drained, moderately permeable soils that formed in residuum of hornblende, gneiss, and schist. These soils are gently sloping to strongly sloping and are on uplands of the Piedmont Plateau. Slopes are dominantly 1 to 10 percent but range up to 15 percent.

Hiwassee soils are on the same landscape as the well drained Cecil, Gwinnett, and Pacolet soils. Cecil soils have a red argillic horizon that has value of 4 or more in the upper part. Gwinnett soils have a thinner solum. Pacolet soils have a thinner solum and a generally higher content of mica.

Typical pedon of Hiwassee sandy loam, 1 to 6 percent slopes, in a pasture 4 miles north-northeast of Opelika, and 2,200 feet north and 2,100 feet east of the southwest corner of sec. 21, T. 20 N., R. 27 E.

Ap—0 to 4 inches; dark reddish brown (2.5YR 3/4) sandy loam; moderate fine granular structure; very friable; many fine roots; 5 percent angular fragments less than 2 inches in diameter; strongly acid; abrupt smooth boundary.

B21t—4 to 26 inches; dark red (2.5YR 3/6) clay; moderate medium subangular blocky structure; firm; few fine flakes of mica; thin patchy clay films on faces of peds; medium acid; gradual smooth boundary.
B22t—26 to 48 inches; dark red (2.5YR 3/6) clay loam; moderate fine and medium subangular blocky structure; firm; common fine flakes of mica; thin patchy clay films on faces of peds; strongly acid; gradual wavy boundary.
C—48 to 80 inches; red (2.5YR 4/6) sandy clay loam; massive; friable; many fine flakes of mica; strongly acid.

The solum is 43 to 60 or more inches thick. The soil is slightly acid to very strongly acid except where lime has been added. Depth to hard rock is more than 6 feet.

The Ap horizon has hue of 5YR or 2.5YR, value of 3, and chroma of 2 through 4.

The B2t horizon has hue of 2.5YR or 10R, value of 3, and chroma of 4 or 6. At a depth of more than 40 inches it may have value of 4. Texture of the B2t horizon is clay or clay loam. Flakes of mica are few to common in the upper part and common to many in the lower part.

The C horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 or 8. Mottles are in shades of brown or yellow. Texture of the C horizon is sandy clay loam, clay loam, loam, or sandy loam.

Kinston series

The Kinston series consists of deep, poorly drained, frequently flooded, moderately permeable soils that formed in alluvium along streams and drainageways. These soils are nearly level and are on flood plains of the Coastal Plain. Slope ranges from 0 to 1 percent.

Kinston soils are on the same landscape as Cartecay, Enoree, and Toccoa soils. These soils have mixed mineralogy. Cartecay soils are somewhat poorly drained. Toccoa soils are well drained.

Typical pedon of Kinston silt loam, 0 to 1 percent slopes, in a wooded area 11 miles south of Opelika, 2,300 feet north and 400 feet west of the southeast corner of sec. 33, T. 18 N., R. 27 E.

A1—0 to 4 inches; very dark grayish brown (10YR 3/2) silt loam; weak fine granular structure; very friable; many fine roots; strongly acid; abrupt smooth boundary.
C1g—4 to 10 inches; dark gray (10YR 4/1) silt loam; few medium prominent strong brown (7.5YR 5/6) mottles; moderate medium granular structure; friable; common fine roots; strongly acid; clear smooth boundary.
C2g—10 to 20 inches; very dark gray (10YR 3/1) silt loam; moderate medium granular structure; friable; few fine roots; strongly acid; clear smooth boundary.
C3g—20 to 47 inches; gray (10YR 5/1) sandy clay loam; common medium distinct brown (10YR 4/3) and yellowish brown (10YR 5/6) mottles; massive; friable; strongly acid; clear wavy boundary.
IICg—47 to 55 inches; gray (10YR 5/1) gravelly sandy clay loam; massive; friable; 30 percent rounded gravel less than 2 inches in diameter; very strongly acid.

Depth to the gravelly IIC horizon ranges from 40 to 60 or more inches. The soil is strongly acid to very strongly acid except where lime has been added.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 1 or 2.

The C horizon has hue of 10YR or 2.5Y, value of 3 through 6, and chroma of 2 or less. It is silt loam, sandy clay loam, or silty clay loam. Mottles are in various shades of brown.

The IIC horizon is mottled yellow, brown, and gray. It is gravelly sandy loam, gravelly sandy clay loam, or gravelly clay loam.

Louisburg series

The Louisburg series consists of moderately deep, well drained to excessively drained, rapidly permeable soils that have formed in residuum of granite, gneiss, and schist. These soils are strongly sloping to steep and are on uplands of the Piedmont Plateau. Slope ranges from 10 to 25 percent.

Louisburg soils are on the same landscape as the well drained Appling, Cecil, and Pacolet soils. These soils have a clayey control section. Appling soils have thicker solum. Cecil and Pacolet soils have a redder argillic horizon.

Typical pedon of Louisburg sandy loam, 10 to 25 percent slopes, in a wooded area 1.1 miles south-southeast of Bleecker, 2,300 feet east and 1,500 feet south of the northwest corner of sec. 8, T. 18 N., R. 29 E.

A1—0 to 3 inches; very dark gray (10YR 3/1) sandy loam; weak fine granular structure; very friable; common fine and medium roots; 15 to 20 percent angular quartz fragments generally less than 2 inches in diameter; very strongly acid; clear smooth boundary.
A2—3 to 8 inches; pale brown (10YR 6/3) sandy loam; weak fine granular structure; very friable; few fine and medium roots; 5 to 10 percent angular quartz fragments; very strongly acid; clear wavy boundary.
B2—8 to 31 inches; yellow (10YR 7/8) sandy loam; weak medium subangular blocky structure; very friable; very strongly acid; clear wavy boundary.
Cr—31 to 40 inches; mottled yellowish brown (10YR 5/8), yellow (10YR 7/6), and white (10YR 8/2) highly weathered granite that crushes to sandy loam; massive; friable.

The solum is 20 to 40 inches thick. Depth to hard rock is more than 4 feet. The soil is medium acid to very

strongly acid. Content of angular fragments ranges from 10 to 30 percent. Some pedons have a thin argillic horizon.

The A1 horizon has hue of 10YR, value of 3 or 4, and chroma of 1 through 3. The A2 horizon has hue of 10YR, value of 5 or 6, and chroma of 3 or 4.

The B horizon has hue of 10YR or 7.5YR, value of 4 through 7, and chroma of 4 through 8. The argillic horizon, where present, has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 or 8.

The C horizon is multicolored, soft saprolite that has rock-controlled structure and crushes to sandy loam.

Marlboro series

The Marlboro series consists of deep, well drained, moderately permeable soils that formed in moderately fine textured marine deposits. These soils are gently sloping and are on uplands of the Coastal Plain. Slope ranges from 1 to 6 percent.

Marlboro soils are on the same landscape as Marvyn, Sacul, and Uchee soils. Marvyn soils are well drained and have a fine-loamy control section. Sacul soils have mottles of low chroma within 24 inches of the top of the argillic horizon and have mixed mineralogy. Uchee soils have a sandy A horizon 20 to 40 inches thick.

Typical pedon of Marlboro loamy sand, 1 to 6 percent slopes, in a cultivated area 1.4 miles west of Marvyn, 1,400 feet east and 1,300 feet south of the northeast corner of sec. 25, T. 17 N., R. 26 E.

Ap—0 to 8 inches; brown (10YR 5/3) loamy sand; weak fine granular structure; very friable; few fine roots; medium acid; abrupt smooth boundary.

B1—8 to 13 inches; pale brown (10YR 6/3) sandy loam; weak fine granular structure; very friable; few fine roots; strongly acid; abrupt smooth boundary.

B21t—13 to 28 inches; yellowish brown (10YR 5/6) clay; moderate medium subangular blocky structure; friable; thin patchy clay films on faces of peds; strongly acid; clear smooth boundary.

B22t—28 to 53 inches; yellowish brown (10YR 5/4) clay; common medium distinct yellowish red (5YR 4/6) mottles; moderate medium subangular blocky structure; firm; thin patchy clay films on faces of peds; strongly acid; gradual smooth boundary.

B23t—53 to 85 inches; mottled light brownish gray (10YR 6/2), brownish yellow (10YR 6/6), strong brown (7.5YR 5/6), yellowish red (5YR 5/6), and red (2.5YR 5/6) clay; weak medium subangular blocky structure; firm; thin patchy clay films on faces of peds; very strongly acid; gradual smooth boundary.

C—85 to 90 inches; mottled red, yellow, brown, and gray sandy clay loam; massive; friable; very strongly acid.

The solum is more than 60 inches thick. The soil is medium acid to very strongly acid throughout except where lime has been added.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3.

The B1 horizon has hue of 10YR, value of 4 through 6, and chroma of 3 or 4. It is sandy loam or sandy clay loam.

The B2t horizon has hue of 10YR, value of 5, and chroma of 4 or 6 or hue of 7.5YR, value of 5, and chroma of 6. Mottles are in shades of yellow, brown, and red at a depth of more than 25 inches. Texture of the B2t horizon is sandy clay, clay loam, or clay.

The C horizon is mottled yellow, brown, red, and gray. It is sandy clay loam, sandy clay, or clay.

Marvyn series

The Marvyn series consists of deep, well drained, moderately permeable soils that formed in medium-textured marine deposits. These soils are gently sloping to sloping and are on uplands of the Coastal Plain. Slopes are dominantly 1 to 6 percent but may be as much as 10 percent.

Marvyn soils are on the same landscape as Blanton, Cowarts, Marlboro, and Uchee soils. Blanton soils are moderately well drained and have a sandy A horizon more than 40 inches thick. Cowarts soils are well drained to moderately well drained and have a solum less than 40 inches thick. Marlboro soils are well drained and have a clayey control section. Uchee soils have a sandy A horizon 20 to 40 inches thick.

Typical pedon of Marvyn loamy sand, 1 to 6 percent slopes, in a cultivated area 2.5 miles west of Marvyn on U.S. Highway 80, 1,600 feet west and 1,100 feet north of the southeast corner of sec. 23, T. 17 N., R. 26 E.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) loamy sand; weak fine granular structure; very friable; many fine roots; 5 percent rounded gravel less than 1 inch in diameter; medium acid; abrupt smooth boundary.

B1—7 to 15 inches; yellowish brown (10YR 5/6) sandy loam; weak medium subangular blocky structure; very friable; common fine roots; sand grains bridged and coated with clay; strongly acid; clear smooth boundary.

B21t—15 to 30 inches; strong brown (7.5YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable; few fine roots; thin patchy clay films on faces of peds; medium acid; clear smooth boundary.

B22t—30 to 44 inches; brownish yellow (10YR 6/6) sandy clay; many medium prominent red (2.5YR 4/8) mottles; moderate medium subangular blocky structure; friable; few fine roots; thin discontinuous clay films on faces of peds; strongly acid; clear smooth boundary.

B3—44 to 53 inches; yellowish red (5YR 5/8) sandy clay; common medium prominent brownish yellow (10YR 6/6) mottles in discontinuous bands; weak

medium subangular blocky structure; friable; few fine roots; patchy clay films on faces of peds; few fine flakes of mica; very strongly acid; abrupt smooth boundary.

C1—53 to 60 inches; mottled red (2.5YR 4/8) sandy loam and light olive brown (2.5Y 5/6) and light gray (10YR 7/2) clay; red and gray bands about 1 cm. thick; massive grading to weak platy structure; friable; few to common fine flakes of mica; very strongly acid; abrupt smooth boundary.

IIC2—60 to 72 inches; reddish yellow (7.5YR 6/8) sandy loam; common medium prominent red mottles; massive; few nodules of white clay; very friable; common to many fine flakes of mica; very strongly acid.

The solum is 40 to 60 inches thick. The soil is strongly acid or very strongly acid throughout except where lime has been added. Flakes of mica are none to few in the lower part of the B horizon and few to many in the C horizon.

The Ap horizon has hue of 10YR, value of 3 through 5, and chroma of 2 or 3.

The B1 horizon has hue of 10YR, value of 4 or 5, and chroma of 4 or 6. It is sandy loam or sandy clay loam.

The B2t horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 or 6. The lower part is distinctly or prominently mottled with yellow, brown, or red. Texture of the B2t horizon is sandy clay loam or sandy clay.

The B3 horizon has hue of 10YR through 5YR, value of 5 or 6, and chroma of 4 through 8. Mottles are in shades of yellow, brown, red, and gray. Texture of the B3 horizon is sandy clay or sandy clay loam.

The C horizon is mottled yellow, brown, red, and gray in bands or strata. It is sandy clay loam, sandy loam, or loamy sand.

Mecklenburg series

The Mecklenburg series consists of moderately deep, well drained, slowly permeable soils that formed in residuum of hornblende, gneiss, and schist. These soils are sloping and are on uplands of the Piedmont Plateau. Slope ranges from 6 to 10 percent.

Mecklenburg soils are on the same landscape as the well drained Cecil and Hiwassee soils. Cecil and Hiwassee soils have base saturation of less than 35 percent. Hiwassee soils have value of less than 4 where hue is 5YR or 2.5YR.

Typical pedon of Mecklenburg silt loam, 6 to 10 percent slopes, in a wooded area 1.0 mile northwest of Goat Rock Dam and 500 feet east and 50 feet north of the southwest corner of sec. 24, T. 19 N., R. 29 E.

Ap—0 to 7 inches; brown (7.5YR 5/4) silt loam; weak medium granular structure; friable; few fine roots; 5 percent angular fragments less than 1 inch in diameter; medium acid; abrupt smooth boundary.

B21t—7 to 21 inches; red (2.5YR 4/6) silty clay; moderate medium subangular blocky structure; very firm; thick discontinuous clay films on faces of peds; medium acid; clear smooth boundary.

B22t—21 to 29 inches; red (2.5YR 4/6) silty clay; common fine distinct yellowish red (5YR 5/6) mottles; moderate medium subangular blocky structure; very firm; thick discontinuous clay films on faces of peds; slightly acid; clear smooth boundary.

B3—29 to 41 inches; red (2.5YR 4/6) silty clay loam; common medium distinct yellowish red (5YR 5/6) and strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; thin patchy clay films on faces of peds; neutral; clear smooth boundary.

C—41 to 45 inches; red (2.5YR 4/6), yellowish red (5YR 5/6), and strong brown (7.5YR 5/6) silty clay loam; rock-controlled structure; neutral.

The solum is 20 to 40 or more inches thick. Depth to hard rock is more than 4 feet. The soil is medium acid to neutral throughout except where lime has been added. Content of angular fragments is as much as 15 percent.

The Ap horizon has hue of 10YR through 2.5YR, value of 4 or 5, and chroma of 2 through 4.

The B2t horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 or 8. Mottles in shades of yellow, brown, or red are in the lower part. Texture of the B2t horizon is silty clay, clay, or clay loam.

The B3 horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 or 8. Mottles are in shades of yellow, brown, and red. Texture of the B3 horizon is silty clay loam, clay loam, or clay.

The C horizon is multicolored saprolite that has rock-controlled structure and crushes to sandy loam, loam, sandy clay loam, or silty clay loam.

Mecklenburg soils in Lee County differ from the soils of the Mecklenburg series in that they are more than 40 percent silt in the control section and have a slightly thicker solum.

Orangeburg series

The Orangeburg series consists of deep, well drained, moderately permeable soils that formed in medium-textured marine deposits. These soils are gently sloping to strongly sloping and are on uplands of the Coastal Plain. Slopes are dominantly 1 to 6 percent but may be as much as 15 percent.

Orangeburg soils are on the same landscape as Cowarts, Marvyn, and Uchee soils. Cowarts soils are well drained to moderately well drained and have a solum less than 40 inches thick. Marvyn soils are well drained and have a solum 40 to 60 inches thick. Uchee soils are well drained and have a sandy A horizon 20 to 40 inches thick.

Typical pedon of Orangeburg loamy sand, 1 to 6 percent slopes, in a cultivated area 1.25 miles west of

Oliver Dam, 1,000 feet east and 500 feet south of the northwest corner of sec. 34, T. 18 N., R. 30 E.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) loamy sand; weak fine granular structure; very friable; few fine roots; very strongly acid; abrupt smooth boundary.
B1—7 to 17 inches; yellowish red (5YR 5/6) sandy loam; weak medium subangular blocky structure; friable; sand grains coated and bridged with clay; very strongly acid; clear smooth boundary.
B21t—17 to 30 inches; red (2.5YR 4/6) sandy clay loam; moderate medium subangular blocky structure; friable; thin patchy clay films on faces of peds; strongly acid; gradual wavy boundary.
B22t—30 to 70 inches; red (2.5YR 4/6) sandy clay; few fine distinct yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6) mottles below a depth of 50 inches; moderate medium subangular blocky structure; friable; thin patchy clay films on faces of peds; very strongly acid.

The solum is more than 60 inches thick. The soil is strongly acid or very strongly acid throughout except where lime has been added.

The Ap horizon has hue of 10YR, value or 4 or 5, and chroma of 2 through 4.

The B1 horizon has hue of 10YR through 5YR, value of 4 or 5, and chroma of 4 or 6.

The B2t horizon is more than 40 inches thick. It has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 or 8. In the lower part, mottles are in shades of brown. Texture of the B2t horizon is sandy clay loam but ranges to sandy clay at a depth of more than 30 inches.

Pacolet series

The Pacolet series consists of moderately deep, well drained, moderately permeable soils that formed in residuum of granite, gneiss, and schist. These soils are gently sloping to strongly sloping and are on uplands of the Piedmont Plateau. Slope ranges from 1 to 15 percent.

Pacolet soils are on the same landscape as the well drained Appling, Cecil, Gwinnett, and Hiwassee soils and the well drained to excessively drained Louisburg soils. Appling soils have a yellower B horizon and a thicker solum. Cecil soils have a thicker solum. Gwinnett and Hiwassee soils are dark red throughout. Louisburg soils have a coarse-loamy control section.

Typical pedon of Pacolet sandy loam, 1 to 6 percent slopes, in a wooded area 6.0 miles northeast of Opelika, 2,500 feet south and 600 feet west of the northeast corner of sec. 25, T. 20 N., R. 27 E.

A1—0 to 6 inches; brown (10YR 4/3) sandy loam; weak fine granular structure; very friable; common fine roots; 10 to 15 percent angular fragments less than 1 inch in diameter; common fine flakes of mica; medium acid; abrupt smooth boundary.
B1—6 to 11 inches; yellowish red (5YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable; thin patchy clay films on faces of peds; few fine roots; common fine flakes of mica; strongly acid; clear smooth boundary.
B21t—11 to 23 inches; red (2.5YR 5/6) clay; moderate medium subangular blocky structure; friable; thick discontinuous clay films on faces of peds; common fine flakes of mica; strongly acid; gradual wavy boundary.
B3—23 to 33 inches; red (2.5YR 5/6) sandy clay loam; weak medium subangular blocky structure; very friable; thin patchy clay films on faces of peds; many fine flakes of mica; strongly acid; gradual wavy boundary.
C—33 to 40 inches; multicolored, soft saprolite that crushes to sandy loam.

The solum is 20 to 40 inches thick. The soil is medium acid to very strongly acid except where lime has been added. Depth to hard rock is more than 5 feet. Content of angular fragments is as much as 15 percent.

The A horizon has hue of 10YR through 5YR, value of 4 or 5, and chroma of 2 through 4.

The B1 horizon, where present, has hue of 5YR, value of 4 or 5, and chroma of 6 or hue of 7.5YR, value of 4 or 5, and chroma of 4. It is loam, sandy clay loam, or clay loam.

The B2t horizon has hue of 2.5YR, value of 4 or 5, and chroma of 6 or 8. Flakes of mica range from few to common. Texture of the B2t horizon is clay or clay loam.

The B3 horizon, where present, has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 4 or 6. Mottles are in shades of yellow, brown, and red. Flakes of mica range from few to many. Texture of the B3 horizon is sandy loam, loam, sandy clay loam, or clay loam.

The C horizon is multicolored, soft saprolite that has rock-controlled structure and crushes to sandy loam.

Sacul series

The Sacul series consists of deep, moderately well drained, slowly permeable soils that formed in fine-textured marine deposits. These soils are gently to strongly sloping and are on uplands of the Coastal Plain. Slope ranges from 1 to 10 percent.

Sacul soils are on the same landscape as the well drained to moderately well drained Cowarts soils and the well drained Marlboro, Marvyn, and Uchee soils. Cowarts and Marvyn soils have a fine-loamy control section. Marlboro soils are moderately permeable. Uchee soils have a sandy A horizon 20 to 40 inches thick.

Typical pedon of Sacul loamy sand, 1 to 6 percent slopes, in a wooded area 0.6 mile south of Sand Hill Church, 1,900 feet west and 700 feet south of the northeast corner of sec. 28, T. 18 N., R. 26 E.

Ap—0 to 8 inches; yellowish brown (10YR 5/4) loamy sand; weak fine granular structure; very friable; common fine roots; medium acid; abrupt smooth boundary.
B21t—8 to 16 inches; yellowish red (5YR 4/6) clay; moderate medium subangular blocky structure; firm; slightly plastic; few fine roots; thick discontinuous clay films on faces of peds; very strongly acid; clear smooth boundary.
B22t—16 to 26 inches; yellowish red (5YR 4/6) clay; common medium distinct strong brown (7.5YR 5/6) and few fine distinct red (2.5YR 4/6) and brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; friable; thick discontinuous clay films on faces of peds; very strongly acid; clear smooth boundary.
B23t—26 to 45 inches; mottled red (2.5YR 4/6), brownish yellow (10YR 6/8), light brownish gray (10YR 6/2), and strong brown (7.5YR 5/8) sandy clay loam; moderate medium subangular blocky structure; friable; thin patchy clay films on faces of peds; very strongly acid; clear smooth boundary.
C—45 to 60 inches; mottled brownish yellow (10YR 6/6), light gray (10YR 6/1), and reddish brown (2.5YR 4/4) strata of loamy and clayey marine sediment; average texture is sandy loam; massive; strongly acid.

The solum is 40 to 60 or more inches thick. The soil is strongly acid to extremely acid except where lime has been added. Content of angular coarse fragments is as much as 10 percent.

The A1 horizon, where present, has hue of 10YR, value of 3 through 5, and chroma of 2 or 3. It is loamy sand, sandy loam, or silt loam.

The Ap and A2 horizons have hue of 10YR or 7.5YR, value of 4 through 5, and chroma of 3 or 4. They are loamy sand, sandy loam, or silt loam.

The B21t and B22t horizons have hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 4 or 6. Mottles are in shades of brown and red in the B21t horizon and brown, red, and gray in the B22t horizon. Texture of these horizons is clay or silty clay.

The B23t and B24t horizons are mottled in hue of 2.5YR through 10YR, value of 4 through 5, and chroma of 1 through 8. They are sandy clay loam, clay loam, silty clay, or silty clay loam.

The C horizon is made up of strata of various textures, ranging from sandy loam to clay. Its average texture is sandy loam, sandy clay loam, or clay loam. Mottles are in shades of yellow, brown, and gray.

Toccoa series

The Toccoa series consists of deep, well drained, moderately rapidly permeable soils that formed in alluvium along streams and drainageways. These soils are nearly level and are on flood plains of the Piedmont Plateau. Slopes are dominantly 0 to 1 percent.

Toccoa soils are on the same landscape as Cartecay and Enoree soils. Cartecay soils are somewhat poorly drained. Enoree soils are poorly drained.

Typical pedon of Toccoa sandy loam, 0 to 1 percent slopes, in a wooded area 3.6 miles east-northeast of Opelika, 2,600 feet south and 150 feet west of the northeast corner of sec. 3, T. 19 N., R. 27 E.

A—0 to 7 inches; brown (10YR 4/3) sandy loam; weak fine granular structure; friable; few fine roots; common fine flakes of mica; strongly acid; abrupt smooth boundary.
C1—7 to 13 inches; brown (7.5YR 4/4) sandy loam; massive parting to weak fine granular structure; friable; common fine flakes of mica; strongly acid; clear smooth boundary.
C2—13 to 24 inches; brown (7.5YR 4/4) sandy loam; massive; very friable; common fine flakes of mica; few thin lenses of yellowish brown silt loam; medium acid; abrupt smooth boundary.
C3—24 to 45 inches; mottled grayish brown (10YR 5/2) and brown (7.5YR 4/4) sandy loam; massive; very friable; common fine flakes of mica; medium acid; clear smooth boundary.
Bb—45 to 60 inches; mottled light brownish gray (10YR 6/2) and yellowish brown (10YR 5/6) sandy clay loam; weak to moderate medium subangular blocky structure; friable; common fine flakes of mica; strongly acid.

The soil is slightly acid to strongly acid. It has thin strata of contrasting textures throughout the soil and few to many flakes of mica in all horizons.

The A horizon has hue of 10YR through 5YR, value of 3 or 4, and chroma of 2 through 4.

The C horizon has hue of 10YR through 5YR, value of 3 through 5, and chroma of 3 through 6. Mottles are in shades of gray at a depth of more than 20 inches. Texture of the C horizon is sandy loam or loam.

In some pedons, there is a buried horizon at a depth of more than 20 inches. The color of this horizon is similar to that of the C horizon. Its texture is sandy clay loam, sandy loam, or loam.

Uchee series

The Uchee series consists of deep, well drained, moderately permeable to moderately slowly permeable soils that formed in loamy marine sediment. These soils are nearly level to strongly sloping and are on uplands of the Coastal Plain. Slopes are dominantly 0 to 6 percent but range up to 15 percent.

Uchee soils are on the same landscape as Blanton, Cowarts, Marvyn, and Orangeburg soils. Blanton soils are moderately well drained and have a sandy A horizon more than 40 inches thick. The well drained to moderately well drained Cowarts soils and the well

drained Marvyn and Orangeburg soils have an A horizon that is less than 20 inches thick.

Typical pedon of Uchee loamy sand, 0 to 6 percent slopes, in a cultivated area 2.2 miles south-southeast of Meadows Mill, 600 feet south and 2,400 feet west of the northeast corner of sec. 4, T. 17 N., R. 28 E.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) loamy sand; single grained; very friable to loose; many fine roots; strongly acid; abrupt smooth boundary.

A2—6 to 26 inches; yellowish brown (10YR 5/4) loamy sand; single grained; very friable to loose; common fine roots; 7 to 10 percent rounded gravel less than 1 inch in diameter; very strongly acid; clear smooth boundary.

B1—26 to 32 inches; yellowish brown (10YR 5/4) sandy loam; common medium distinct pockets of light yellowish brown (10YR 6/4); very weak fine subangular blocky structure; very friable, slightly brittle; few fine roots; 4 to 5 percent rounded gravel less than 1 inch in diameter; very strongly acid; clear smooth boundary.

B21t—32 to 39 inches; brownish yellow (10YR 6/6) sandy clay loam; common medium distinct strong brown (7.5YR 5/6) and few medium distinct very pale brown (10YR 7/4) mottles; weak medium subangular blocky structure; friable, slightly brittle; compact in place; thin patchy clay films on faces of peds; few fine roots; 10 to 12 percent rounded gravel less than 2 inches in diameter; very strongly acid; abrupt smooth boundary.

B22t—39 to 47 inches; brownish yellow (10YR 6/8) clay; common medium prominent red (2.5YR 4/6) and strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; firm; thin patchy clay films on faces of most peds; 5 to 8 percent rounded gravel less than one-half inch in diameter; very strongly acid; clear smooth boundary.

C1—47 to 66 inches; mottled strong brown (7.5YR 5/6), red (2.5YR 4/6), and very pale brown (10YR 7/4) sandy clay loam; massive; friable; common coarse pockets of white (10YR 8/2) clay that is massive and very firm; few fine flakes of mica; very strongly acid; abrupt smooth boundary.

IIC2—66 to 84 inches; white (10YR 8/1) loamy sand; few fine distinct pink (7.5YR 7/4) mottles; massive; very friable; few vertical pockets of yellowish red (5YR 5/8) clay; common fine flakes of mica; very strongly acid.

The solum is 40 to 60 or more inches thick. The soil is strongly acid to very strongly acid except where lime has been added. Content of fragments is generally less than 15 percent. Flakes of mica are none to few in the B horizon and few to many in the C horizon.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 through 4.

The A2 horizon has hue of 10YR, value of 5 or 6, and chroma of 4 or 6. It is loamy sand or sand.

The Bl horizon has hue of 10YR, value of 5 or 6, and chroma of 4 through 8. Mottles are in shades of brown, yellow, or red. Texture of the B1 horizon is sandy loam or sandy clay loam.

The B2t horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 6 or 8. Mottles are in shades of yellow, brown, red, and gray. In some pedons the horizon is mottled with these colors. Texture of the B2t horizon is sandy clay loam, sandy clay, or clay.

The C horizon is mottled yellow, brown, red, and gray. The sand grains are generally coarser and sharper than those in the upper horizons. Texture of the C horizon is sandy clay loam, sandy loam, or loamy sand.

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glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly such soil formed in recent alluvium or on steep rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	More than 12

Base saturation. The degree to which material having cation exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bottom land. The normal flood plain of a stream, subject to flooding.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

Chiseling. Tillage with an implement having one or more soil-penetrating points that loosen the subsoil and bring clods to the surface. A form of emergency tillage to control soil blowing.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15.2 to 38.1 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Compressible (in tables). Excessive decrease in volume of soft soil under load.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The

composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—
Loose.—Noncoherent when dry or moist; does not hold together in a mass.
Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.
Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.
Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.
Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.
Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.
Soft.—When dry, breaks into powder or individual grains under very slight pressure.
Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:
Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.
Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.
Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.
Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.
Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.
Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.
Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.
Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, and clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual.* The major horizons of mineral soil are as follows:
A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.
B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.
C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Roman numeral II precedes the letter C.
R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as

contrasted with percolation, which is movement of water through soil layers or material.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Large stones (in tables). Rock fragments 3 inches (7.5 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Sandy loam and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.20 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Pitting (in tables). Pits caused by melting ground ice. They form on the soil after plant cover is removed.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. The water can be removed only by percolation or evapotranspiration.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Saprolite (soil science). Unconsolidated residual material underlying the soil and grading to hard bedrock below.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and runoff water.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.5 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 mm in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A and B

horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stone line. A concentration of coarse fragments in a soil. Generally it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field is generally built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, are in soils in extremely small amounts. They are essential to plant growth.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Recorded in the period 1951-77 at Opelika, Alabama]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days[1]	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January	55.0	31.0	43.0	76	5	71	5.45	3.64	7.10	9	.3
February	58.6	31.9	45.3	80	12	50	5.47	3.02	7.46	6	.5
March	66.7	39.4	53.1	84	21	177	7.25	4.87	9.41	8	.0
April	76.3	48.1	62.2	89	30	366	5.27	2.28	7.69	6	.0
May	82.7	55.2	69.0	94	37	589	3.57	1.79	5.02	6	.0
June	87.8	62.6	75.3	97	48	759	4.40	2.11	6.27	7	.0
July	89.8	66.2	78.0	99	56	868	6.01	3.82	7.98	9	.0
August	89.4	66.0	77.7	96	57	859	4.26	2.14	5.99	6	.0
September	85.1	61.6	73.3	95	46	699	4.37	2.68	5.88	6	.0
October	75.9	49.0	62.4	89	30	384	3.28	.82	5.27	4	.0
November	66.6	39.7	53.2	82	22	144	3.66	1.97	5.04	6	.0
December	58.5	33.7	46.1	78	13	58	5.41	3.23	7.35	7	.0
Yearly:											
Average	74.4	48.7	61.6	---	---	---	---	---	---	---	---
Extreme	---	---	---	99	5	---	---	---	---	---	---
Total	---	---	---	---	---	5,024	58.40	50.00	65.95	80	.8

[1]A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature (50° F) below which growth is minimal for the principal crops in the area.

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Recorded in the period 1951-77 at Opelika, Alabama]

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	March 23	March 31	April 17
2 years in 10 later than--	March 16	March 26	April 12
5 years in 10 later than--	March 1	March 18	April 3
First freezing temperature in fall:			
1 year in 10 earlier than--	November 13	November 1	October 23
2 years in 10 earlier than--	November 19	November 6	October 27
5 years in 10 earlier than--	December 1	November 15	November 3

TABLE 3.--GROWING SEASON

[Recorded in the period 1951-77 at Opelika, Alabama]

Probability	Daily minimum temperature		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	242	225	192
8 years in 10	253	231	200
5 years in 10	274	242	214
2 years in 10	295	253	228
1 year in 10	307	259	235

TABLE 4.--POTENTIAL AND LIMITATIONS OF MAP UNITS ON THE GENERAL SOIL MAP

Map Unit	Extent of area	Cultivated crops	Woodland	Urban uses	Intensive recreation areas	Extensive recreation areas
	Pct.					
1. Pacolet-Cecil	59	Fair: slope, erodes easily.	Good------	Fair: slope, too clayey, low strength.	Fair: slope.	Good.
2. Marvyn-Cowarts-Uchee	22	Good to fair: slope.	Good------	Good to fair: percs slowly.	Good--------	Good.
3. Gwinnett-Hiwassee	10	Fair: slope, erodes easily.	Good------	Fair: slope, too clayey, low strength.	Fair: slope.	Good.
4. Uchee-Blanton	9	Fair to poor: slope, droughty.	Good------	Good to fair: slope, wetness, too sandy.	Fair: slope, droughty.	Fair: droughty.

TABLE 5.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
2	Appling sandy loam, 1 to 6 percent slopes	5,509	1.4
3	Appling sandy loam, 6 to 10 percent slopes	3,835	1.0
4	Blanton loamy sand, 0 to 5 percent slopes	5,665	1.4
5	Blanton loamy sand, 5 to 10 percent slopes	8,150	2.1
6	Cartecay silt loam, 0 to 1 percent slopes	6,240	1.6
7	Cecil sandy loam, 1 to 6 percent slopes	29,980	7.6
8	Cecil sandy loam, 6 to 10 percent slopes	28,650	7.2
9	Cecil sandy loam, 10 to 15 percent slopes	15,835	4.0
10	Cecil cobbly loam, 10 to 25 percent slopes	3,645	0.9
11	Cowarts loamy sand, 2 to 6 percent slopes	7,390	1.9
12	Cowarts loamy sand, 6 to 10 percent slopes	13,735	3.5
13	Cowarts loamy sand, 10 to 15 percent slopes	2,170	0.5
14	Durham sandy loam, 1 to 6 percent slopes	2,040	0.5
15	Enoree silt loam, 0 to 1 percent slopes	3,840	1.0
16	Gwinnett sandy loam, 1 to 6 percent slopes	6,775	1.7
17	Gwinnett sandy loam, 6 to 10 percent slopes	9,565	2.4
18	Gwinnett sandy loam, 10 to 15 percent slopes	6,220	1.6
19	Hiwassee sandy loam, 1 to 6 percent slopes	6,805	1.7
20	Hiwassee sandy loam, 6 to 10 percent slopes	5,230	1.3
21	Kinston silt loam, 0 to 1 percent slopes	11,395	2.9
22	Louisburg sandy loam, 10 to 25 percent slopes	4,030	1.0
23	Marlboro loamy sand, 1 to 6 percent slopes	1,145	0.3
24	Marvyn loamy sand, 1 to 6 percent slopes	30,755	7.8
25	Marvyn loamy sand, 6 to 10 percent slopes	4,470	1.1
26	Marvyn-Urban land complex, 1 to 8 percent slopes	1,280	0.3
27	Mecklenburg silt loam, 6 to 10 percent slopes	830	0.2
28	Orangeburg loamy sand, 1 to 6 percent slopes	2,185	0.6
29	Orangeburg loamy sand, 6 to 10 percent slopes	585	0.1
30	Orangeburg complex, 10 to 20 percent slopes	605	0.2
31	Pacolet sandy loam, 1 to 6 percent slopes	33,505	8.5
32	Pacolet sandy loam, 6 to 10 percent slopes	56,966	14.4
33	Pacolet sandy loam, 10 to 15 percent slopes	19,630	5.0
34	Pacolet-Urban land complex, 1 to 10 percent slopes	3,790	1.0
35	Pits	500	0.1
36	Sacul loamy sand, 1 to 6 percent slopes	2,150	0.5
37	Sacul loamy sand, 6 to 10 percent slopes	2,175	0.5
38	Sacul silt loam, 1 to 4 percent slopes	1,000	0.3
39	Toccoa sandy loam, 0 to 1 percent slopes	13,775	3.5
40	Uchee loamy sand, 0 to 6 percent slopes	16,100	4.0
41	Uchee loamy sand, 6 to 10 percent slopes	11,205	2.8
42	Uchee loamy sand, 10 to 15 percent slopes	1,815	0.5
43	Urban land	510	0.1
	Water	3,840	1.0
	Total	395,520	100.0

TABLE 6.--YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Map symbol and soil name	Corn	Cotton lint	Soybeans	Bahiagrass	Tall fescue	Improved bermuda-grass	Cool season grass
	Bu	Lb	Bu	AUM*	AUM*	AUM*	AUM*
2---- Appling	85	---	---	6.5	6.5	---	4.5
3---- Appling	80	---	---	6.0	6.0	---	4.0
4---- Blanton	60	---	---	7.5	---	8.0	4.2
5---- Blanton	50	---	---	7.0	---	7.5	4.0
6---- Cartecay	90	---	30	7.0	7.0	---	3.5
7---- Cecil	85	---	30	9.0	7.5	9.0	4.7
8---- Cecil	80	---	---	8.0	6.5	8.0	4.5
9---- Cecil	75	---	---	7.5	6.0	7.5	4.3
10. Cecil							
11---- Cowarts	75	650	30	8.0	---	8.0	4.5
12, 13---- Cowarts	---	---	---	7.0	---	7.0	4.3
14---- Durham	85	---	---	6.5	7.0	---	4.5
15---- Enoree	---	---	---	---	---	---	---
16---- Gwinnett	85	---	---	8.0	7.5	8.5	4.5
17---- Gwinnett	75	---	---	7.5	7.0	8.0	4.3
18---- Gwinnett	---	---	---	7.0	5.0	---	4.0
19---- Hiwassee	85	---	---	8.0	7.5	8.5	4.7
20---- Hiwassee	75	---	---	7.5	7.0	8.0	4.5
21---- Kinston	---	---	---	5.5	5.0	5.0	---
22---- Louisburg	---	---	---	---	---	---	---
23---- Marlboro	90	900	40	9.5	8.5	10.0	4.7

See footnote at end of table.

TABLE 6.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Corn	Cotton lint	Soybeans	Bahiagrass	Tall fescue	Improved bermuda-grass	Cool season grass
	Bu	Lb	Bu	AUM*	AUM*	AUM*	AUM*
24--Marvyn	70	750	45	10.0	8.5	10.0	4.7
25--Marvyn	60	650	35	9.0	8.0	9.0	4.5
26--Marvyn-Urban land	---	---	---	---	---	---	---
27--Mecklenburg	80	500	25	6.5	4.5	7.0	---
28--Orangeburg	90	800	35	8.5	---	10.0	4.7
29--Orangeburg	80	650	30	8.0	---	9.0	4.5
30--Orangeburg	---	---	---	6.0	---	---	---
31--Pacolet	80	---	---	8.5	7.5	8.5	4.5
32--Pacolet	75	---	---	8.0	6.5	8.0	4.3
33--Pacolet	65	---	---	6.5	5.5	---	---
34--Pacolet-Urban land	---	---	---	---	---	---	---
35. Pits							
36--Sacul	65	---	25	7.0	---	6.5	4.0
37--Sacul	---	---	---	6.5	---	6.0	3.5
38--Sacul	65	---	25	7.5	7.0	6.5	3.5
39--Toccoa	80	---	---	9.0	7.0	9.0	4.5
40--Uchee	70	550	30	8.5	---	8.5	4.5
41--Uchee	65	500	25	8.5	---	8.0	4.2
42--Uchee	---	---	---	7.5	---	---	---
43. Urban land							

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

TABLE 7.--CAPABILITY CLASSES AND SUBCLASSES

[Miscellaneous areas are excluded. Absence of an entry indicates no acreage]

Class	Total acreage	Major management concerns (Subclass)		
		Erosion (e)	Wetness (w)	Soil problem (s)
		Acres	Acres	Acres
I	---	---	---	---
II	142,189	126,089	---	16,100
III	163,901	127,016	20,015	16,870
IV	55,995	46,030	---	9,965
V	3,840	---	3,840	---
VI	15,645	4,250	11,395	---
VII	4,030	4,030	---	---
VIII	---	---	---	---

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Map symbol and soil name	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
2, 3---------- Appling	3o	Slight	Slight	Slight	Slight	Loblolly pine-------	81	Loblolly pine, slash pine, yellow-poplar.
						Shortleaf pine------	65	
						Southern red oak----	76	
						White oak-----------	71	
						Yellow-poplar-------	90	
4, 5---------- Blanton	3s	Slight	Moderate	Moderate	Slight	Slash pine----------	80	Loblolly pine, longleaf pine, slash pine.
						Loblolly pine-------	80	
						Longleaf pine-------	70	
6---------- Cartecay	2w	Slight	Moderate	Slight	Moderate	Loblolly pine-------	95	Loblolly pine, sweetgum, slash pine, yellow-poplar, American sycamore, water oak, eastern cottonwood.
						Sweetgum------------	95	
						Yellow-poplar-------	105	
						Water oak-----------	85	
						Southern red oak----	85	
7, 8, 9---------- Cecil	3o	Slight	Slight	Slight	Slight	Loblolly pine-------	80	Loblolly pine, slash pine, yellow-poplar.
						Shortleaf pine------	69	
						Black oak-----------	66	
						Northern red oak----	82	
						Southern red oak----	---	
						Post oak------------	65	
						Scarlet oak---------	80	
						White oak-----------	---	
10---------- Cecil	3r	Moderate	Moderate	Slight	Slight	Loblolly pine-------	80	Loblolly pine, slash pine, yellow-poplar.
						Shortleaf pine------	69	
						Southern red oak----	---	
						Scarlet oak---------	80	
						White oak-----------	---	
11, 12, 13--------- Cowarts	2o	Slight	Slight	Slight	Slight	Loblolly pine-------	86	Loblolly pine, slash pine.
						Slash pine----------	86	
						Longleaf pine-------	67	
14---------- Durham	3o	Slight	Slight	Slight	Slight	Loblolly pine-------	80	Loblolly pine, slash pine, yellow-poplar.
						Post oak------------	70	
						Shortleaf pine------	72	
						Southern red oak----	80	
						Sweetgum------------	80	
						White oak-----------	70	
						Yellow-poplar-------	80	
15---------- Enoree	2w	Slight	Severe	Severe	Moderate	Loblolly pine-------	90	Loblolly pine, slash pine, sweetgum, eastern cottonwood, green ash.
						Slash pine----------	90	
						Shortleaf pine------	80	
						Sweetgum------------	90	
						Eastern cottonwood--	90	
						American sycamore---	90	
16, 17, 18--------- Gwinnett	3o	Slight	Slight	Slight	Slight	Loblolly pine-------	81	Loblolly pine, slash pine, yellow-poplar.
						Southern red oak----	72	
						White oak-----------	69	
19, 20---------- Hiwassee	3o	Slight	Slight	Slight	Slight	Loblolly pine-------	75	Loblolly pine, yellow-poplar, slash pine.
						Northern red oak----	70	
						Shortleaf pine------	70	
						White oak-----------	70	
						Yellow-poplar-------	85	

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
21---------- Kinston	1w	Slight	Severe	Severe	Moderate	Loblolly pine--------- Sweetgum---------- White oak---------- Eastern cottonwood-- Cherrybark oak------	100 95 90 100 95	Loblolly pine, slash pine, eastern cottonwood, green ash, sweetgum.
22---------- Louisburg	3r	Moderate	Moderate	Slight	Slight	Loblolly pine--------- Shortleaf pine------ Southern red oak---- Yellow-poplar------- White oak----------	77 69 72 84 68	Loblolly pine, slash pine, yellow-poplar.
23---------- Marlboro	3o	Slight	Slight	Slight	Slight	Loblolly pine--------- Slash pine---------- Longleaf pine-------	82 80 62	Slash pine, loblolly pine.
24, 25---------- Marvyn	2o	Slight	Slight	Slight	Slight	Loblolly pine--------- Slash pine---------- Longleaf pine-------	88 88 70	Slash pine, loblolly pine.
27---------- Mecklenburg	4o	Slight	Slight	Slight	Slight	Loblolly pine--------- Shortleaf pine------ Southern red oak---- Sweetgum---------- White oak---------- Yellow-poplar-------	75 67 75 82 71 89	Loblolly pine, slash pine.
28, 29, 30*-------- Orangeburg	2o	Slight	Slight	Slight	Slight	Loblolly pine--------- Slash pine---------- Longleaf pine-------	86 86 70	Slash pine, loblolly pine.
31, 32, 33--------- Pacolet	3o	Slight	Slight	Slight	Slight	Loblolly pine--------- Shortleaf pine------ Yellow-poplar-------	78 70 90	Loblolly pine, slash pine, yellow-poplar.
36, 37, 38--------- Sacul	3c	Moderate	Slight	Slight	Slight	Loblolly pine--------- Shortleaf pine------	80 70	Loblolly pine, slash pine.
39---------- Toccoa	1o	Slight	Slight	Slight	Slight	Loblolly pine--------- Yellow-poplar------- Sweetgum---------- Southern red oak----	90 107 100 ---	Loblolly pine, slash pine, yellow-poplar, American sycamore, cherrybark oak.
40, 41, 42--------- Uchee	3s	Slight	Moderate	Moderate	Slight	Loblolly pine--------- Longleaf pine------- Shortleaf pine------	82 67 ---	Loblolly pine, longleaf pine, slash pine.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails
2--- Appling	Slight	Slight	Moderate: slope.	Slight.
3--- Appling	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
4--- Blanton	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.
5--- Blanton	Moderate: too sandy.	Moderate: too sandy.	Severe: slope.	Moderate: too sandy.
6--- Cartecay	Severe: floods, wetness.	Moderate: floods, wetness.	Severe: floods, wetness.	Moderate: wetness.
7--- Cecil	Slight	Slight	Moderate: slope.	Slight.
8, 9--- Cecil	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
10--- Cecil	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Moderate: slope.
11--- Cowarts	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight.
12, 13--- Cowarts	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight.
14--- Durham	Slight	Slight	Moderate: slope.	Slight.
15--- Enoree	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.
16--- Gwinnett	Slight	Slight	Moderate: slope.	Slight.
17, 18--- Gwinnett	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
19--- Hiwassee	Slight	Slight	Moderate: slope.	Slight.
20--- Hiwassee	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
21--- Kinston	Severe: floods, wetness.	Severe: floods, wetness.	Severe: wetness, floods.	Severe: wetness, floods.
22--- Louisburg	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
23--- Marlboro	Slight	Slight	Moderate: slope.	Slight.
24--- Marvyn	Slight	Slight	Moderate: slope.	Slight.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails
25--Marvyn	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
26:* Marvyn	Slight	Slight	Moderate: slope.	Slight.
Urban land.				
27--Mecklenburg	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight.
28--Orangeburg	Slight	Slight	Moderate: slope.	Slight.
29, 30*--Orangeburg	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
31--Pacolet	Slight	Slight	Moderate: slope.	Slight.
32, 33--Pacolet	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
34:* Pacolet	Slight	Slight	Moderate: slope.	Slight.
Urban land.				
35. Pits				
36--Sacul	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight.
37--Sacul	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight.
38--Sacul	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight.
39--Toccoa	Severe: floods.	Moderate: floods.	Severe: floods.	Slight.
40--Uchee	Slight	Slight	Moderate: slope, small stones.	Slight.
41, 42--Uchee	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
43. Urban land				

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
2---------- Appling	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
3---------- Appling	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
4, 5---------- Blanton	Poor	Fair	Fair	Poor	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
6---------- Cartecay	Poor	Fair	Fair	Good	Good	Fair	Poor	Fair	Good	Fair.
7---------- Cecil	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
8, 9---------- Cecil	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
10---------- Cecil	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
11, 12, 13--------- Cowarts	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
14---------- Durham	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
15---------- Enoree	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
16---------- Gwinnett	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
17, 18---------- Gwinnett	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
19---------- Hiwassee	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
20---------- Hiwassee	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
21---------- Kinston	Very poor.	Poor	Poor	Fair	Poor	Good	Fair	Poor	Fair	Fair.
22---------- Louisburg	Poor	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
23---------- Marlboro	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
24---------- Marvyn	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
25---------- Marvyn	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
26:* Marvyn---------- Urban land.	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
27---------- Mecklenburg	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
28---------- Orangeburg	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
29, 30*---------- Orangeburg	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
31, 32---------- Pacolet	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
33---------- Pacolet	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
34:* Pacolet----------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Urban land.										
35. Pits										
36---------- Sacul	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
37---------- Sacul	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
38---------- Sacul	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
39---------- Toccoa	Poor	Fair	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
40---------- Uchee	Poor	Fair	Good	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
41, 42---------- Uchee	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
43. Urban land										

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
2---- Appling	Moderate: too clayey.	Slight	Slight	Slight	Moderate: low strength.	Slight.
3---- Appling	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
4---- Blanton	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Slight	Moderate: droughty.
5---- Blanton	Severe: cutbanks cave.	Slight	Moderate: wetness.	Moderate: slope.	Slight	Moderate: droughty.
6---- Cartecay	Severe: wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.
7---- Cecil	Moderate: too clayey.	Slight	Slight	Slight	Moderate: low strength.	Slight.
8, 9---- Cecil	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
10---- Cecil	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
11---- Cowarts	Slight	Slight	Slight	Moderate: slope.	Slight	Slight.
12, 13---- Cowarts	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
14---- Durham	Slight	Slight	Slight	Slight	Slight	Slight.
15---- Enoree	Severe: wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.
16---- Gwinnett	Moderate: too clayey.	Slight	Slight	Slight	Moderate: low strength.	Slight.
17, 18---- Gwinnett	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
19---- Hiwassee	Moderate: too clayey.	Slight	Slight	Slight	Moderate: low strength.	Slight.
20---- Hiwassee	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
21---- Kinston	Severe: wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: low strength, wetness, floods.	Severe: floods, wetness.
22---- Louisburg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
23---- Marlboro	Moderate: too clayey.	Slight	Slight	Slight	Moderate: low strength.	Slight.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
24---- Marvyn	Slight	Slight	Slight	Slight	Moderate: low strength.	Slight.
25---- Marvyn	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
26:* Marvyn---- Urban land.	Slight	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
27---- Mecklenburg	Moderate: too clayey.	Moderate: slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
28---- Orangeburg	Slight	Slight	Slight	Slight	Slight	Slight.
29, 30*---- Orangeburg	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
31---- Pacolet	Moderate: too clayey.	Slight	Slight	Slight	Moderate: low strength.	Slight.
32, 33---- Pacolet	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
34:* Pacolet---- Urban land.	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength, slope.	Slight.
35. Pits						
36---- Sacul	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.
37---- Sacul	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.	Moderate: slope.
38---- Sacul	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.
39---- Toccoa	Moderate: wetness, floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe. floods.
40---- Uchee	Moderate: cutbanks cave.	Slight	Moderate: wetness, shrink-swell.	Slight	Slight	Moderate: droughty.
41, 42---- Uchee	Moderate: cutbanks cave.	Moderate: slope.	Moderate: wetness, shrink-swell, slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
43. Urban land						

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
2--- Appling	Moderate: percs slowly.	Moderate: slope, seepage.	Moderate: too clayey.	Slight---	Fair: too clayey.
3--- Appling	Moderate: slope, percs slowly.	Severe: slope.	Moderate: too clayey, slope.	Moderate: slope.	Fair: too clayey, slope.
4--- Blanton	Moderate: wetness.	Severe: seepage.	Moderate: too sandy.	Severe: seepage.	Fair: too sandy.
5--- Blanton	Moderate: wetness.	Severe: seepage, slope.	Moderate: too sandy.	Severe: seepage.	Fair: too sandy.
6--- Cartecay	Severe: wetness, floods.	Severe: wetness, seepage, floods.	Severe: floods, seepage, wetness.	Severe: floods, seepage, wetness.	Good.
7--- Cecil	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey, seepage.	Slight---	Fair: too clayey.
8, 9--- Cecil	Moderate: percs slowly, slope.	Severe: slope.	Moderate: too clayey, seepage.	Moderate: slope.	Fair: too clayey, slope.
10--- Cecil	Severe: slope.	Severe: slope.	Moderate: too clayey, seepage, slope.	Severe: slope.	Poor: small stones, slope.
11--- Cowarts	Severe: percs slowly.	Moderate: slope.	Slight---	Slight---	Good.
12, 13--- Cowarts	Severe: percs slowly.	Severe: slope.	Moderate: slope.	Moderate: slope	Fair: slope.
14--- Durham	Slight---	Moderate: seepage.	Slight---	Slight---	Good.
15--- Enoree	Severe: floods, wetness.	Severe: seepage, floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Poor: wetness.
16--- Gwinnett	Moderate: percs slowly.	Moderate: slope, seepage.	Moderate: too clayey.	Slight---	Fair: too clayey.
17, 18--- Gwinnett	Moderate: percs slowly, slope.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Fair: too clayey, slope.
19--- Hiwassee	Moderate: percs slowly.	Moderate: slope, seepage.	Moderate: too clayey.	Slight---	Fair: too clayey.
20--- Hiwassee	Moderate: percs slowly, slope.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Fair: too clayey, slope.

TABLE 12.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
21--- Kinston	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Poor: wetness.
22--- Louisburg	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope, depth to rock.	Severe: seepage, slope.	Poor: slope.
23--- Marlboro	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight---	Fair: too clayey.
24--- Marvyn	Slight---	Moderate: seepage, slope.	Slight---	Slight---	Good.
25--- Marvyn	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
26:* Marvyn--- Urban land.	Slight---	Moderate: seepage, slope.	Slight---	Slight---	Good.
27--- Mecklenburg	Severe: percs slowly.	Severe: slope.	Severe: too clayey, depth to rock.	Moderate: slope.	Poor: thin layer.
28--- Orangeburg	Slight---	Moderate: seepage, slope.	Slight---	Slight---	Good.
29, 30*--- Orangeburg	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
31--- Pacolet	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight---	Fair: too clayey.
32, 33--- Pacolet	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
34:* Pacolet--- Urban land.	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight---	Fair: too clayey.
35. Pits					
36--- Sacul	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight---	Poor: too clayey, hard to pack.
37--- Sacul	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
38--- Sacul	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight---	Poor: too clayey, hard to pack.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
39---------- Toccoa	Severe: floods, wetness.	Severe: seepage, floods, wetness.	Severe: floods, seepage, wetness.	Severe: floods, seepage, wetness.	Good.
40---------- Uchee	Severe: wetness, percs slowly.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: too sandy.
41, 42---------- Uchee	Severe: wetness, percs slowly.	Severe: slope, seepage.	Severe: seepage.	Severe: seepage.	Fair: too sandy, slope.
43. Urban land					

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," "poor," and "improbable." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
2, 3---Appling	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
4, 5---Blanton	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
6---Cartecay	Fair: wetness.	Improbable: excess fines	Improbable: excess fines.	Poor: wetness.
7, 8, 9---Cecil	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
10---Cecil	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, thin layer.
11---Cowarts	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
12, 13---Cowarts	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
14---Durham	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
15---Enoree	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
16, 17, 18---Gwinnett	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
19, 20---Hiwassee	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
21---Kinston	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
22---Louisburg	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
23---Marlboro	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
24---Marvyn	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
25---Marvyn	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer, slope.
26:* Marvyn---Urban land.	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
27---Mecklenburg	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
28---Orangeburg	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
29, 30*---------- Orangeburg	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer, slope.
31, 32, 33---------- Pacolet	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
34:* Pacolet----------	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Urban land.				
35. Pits				
36, 37, 38---------- Sacul	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good: thin layer.
39---------- Toccoa	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
40---------- Uchee	Fair: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy, small stones.
41, 42---------- Uchee	Fair: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy, small stones, slope.
43. Urban land				

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated]

Map symbol and soil name	Limitations for--		Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Terraces and diversions	Grassed waterways
2---- Appling	Moderate: seepage, slope.	Moderate: hard to pack, piping.	Deep to water----	Favorable--------	Favorable.
3---- Appling	Moderate: seepage, slope.	Moderate: hard to pack, piping.	Deep to water----	Slope----------	Slope.
4, 5---- Blanton	Severe: seepage.	Severe: seepage.	Deep to water----	Too sandy, soil blowing.	Droughty.
6---- Cartecay	Moderate: seepage.	Severe: wetness.	Floods----------	Wetness----------	Wetness.
7---- Cecil	Moderate: seepage, slope.	Moderate: hard to pack, piping.	Deep to water----	Favorable--------	Favorable.
8---- Cecil	Severe: slope.	Moderate: hard to pack, piping.	Deep to water----	Favorable--------	Favorable.
9---- Cecil	Severe: slope.	Moderate: hard to pack, piping.	Deep to water----	Slope----------	Slope.
10---- Cecil	Severe: slope.	Moderate: hard to pack.	Deep to water----	Slope, large stones.	Slope.
11---- Cowarts	Slight----------	Moderate: piping.	Deep to water----	Percs slowly-----	Percs slowly.
12, 13---- Cowarts	Severe: slope.	Moderate: piping.	Deep to water----	Slope, percs slowly.	Slope, percs slowly.
14---- Durham	Moderate: seepage.	Slight----------	Deep to water----	Favorable--------	Slope.
15---- Enoree	Severe: seepage.	Severe: wetness.	Floods----------	Wetness----------	Wetness.
16---- Gwinnett	Moderate: seepage, slope.	Moderate: hard to pack.	Deep to water----	Favorable--------	Favorable.
17, 18---- Gwinnett	Severe: slope.	Moderate: hard to pack.	Deep to water----	Slope----------	Slope.
19---- Hiwassee	Moderate: seepage, slope.	Moderate: hard to pack.	Deep to water----	Favorable--------	Favorable.
20---- Hiwassee	Severe: slope.	Moderate: hard to pack.	Deep to water----	Slope----------	Slope.
21---- Kinston	Moderate: seepage.	Severe: wetness.	Deep to water----	Wetness----------	Wetness.
22---- Louisburg	Severe: seepage, slope.	Moderate: thin layer.	Deep to water----	Slope----------	Slope.
23---- Marlboro	Moderate: seepage, slope.	Moderate: piping.	Deep to water----	Favorable--------	Favorable.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--		Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Terraces and diversions	Grassed waterways
24--- Marvyn	Moderate: seepage, slope.	Moderate: piping, hard to pack.	Deep to water----	Favorable---------	Favorable.
25--- Marvyn	Severe: slope.	Moderate: piping, hard to pack.	Deep to water----	Slope----------	Slope.
26:* Marvyn---------- Urban land.	Moderate: seepage, slope.	Moderate: piping, hard to pack.	Deep to water----	Favorable---------	Favorable.
27--- Mecklenburg	Slight----------	Severe: hard to pack.	Deep to water----	Slope, percs slowly.	Percs slowly, slope.
28--- Orangeburg	Moderate: seepage, slope.	Moderate: piping.	Deep to water----	Favorable---------	Favorable.
29, 30*---------- Orangeburg	Severe: slope.	Moderate: piping.	Deep to water----	Slope----------	Slope.
31--- Pacolet	Moderate: seepage, slope.	Moderate: piping, hard to pack.	Deep to water----	Favorable---------	Favorable.
32, 33---------- Pacolet	Severe: slope.	Moderate: piping, hard to pack.	Deep to water----	Slope----------	Slope.
34:* Pacolet---------- Urban land.	Moderate: seepage, slope.	Moderate: piping, hard to pack.	Deep to water----	Favorable---------	Favorable.
35. Pits					
36--- Sacul	Moderate: slope.	Severe: hard to pack.	Deep to water----	Percs slowly-----	Percs slowly.
37--- Sacul	Severe: slope.	Severe: hard to pack.	Deep to water----	Slope, percs slowly.	Slope, percs slowly.
38--- Sacul	Slight----------	Severe: hard to pack.	Deep to water----	Percs slowly-----	Percs slowly.
39--- Toccoa	Severe: seepage.	Severe: piping.	Floods----------	Favorable---------	Favorable.
40--- Uchee	Moderate: seepage, slope.	Moderate: seepage, piping.	Deep to water----	Too sandy---------	Droughty.
41, 42---------- Uchee	Severe: slope.	Moderate: seepage, piping.	Deep to water----	Too sandy, slope.	Droughty, slope.
43. Urban land					

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated]

Map symbol and soil name	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
2	0-8	Sandy loam	SM, SM-SC	A-2	0-5	86-100	80-100	55-75	15-35	<27	NP-5
Appling	8-35	Sandy clay, clay loam, clay.	MH, CL, ML, SC	A-7	0-5	95-100	95-100	70-92	51-80	41-74	15-30
	35-54	Sandy clay, clay loam, sandy clay loam.	SC, CL	A-4, A-6	0-5	95-100	95-100	70-90	40-75	25-45	8-22
	54-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
3	0-7	Sandy loam	SM, SM-SC	A-2	0-5	86-100	80-100	55-75	15-35	<27	NP-5
Appling	7-29	Sandy clay, clay loam, clay.	MH, CL, ML, SC	A-7	0-5	95-100	95-100	70-92	51-80	41-74	15-30
	29-44	Sandy clay, clay loam, sandy clay loam.	SC, CL	A-4, A-6	0-5	95-100	95-100	70-90	40-75	25-45	8-22
	44-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
4	0-48	Loamy sand	SM	A-2-4	0	100	100	85-100	13-25	---	NP
Blanton	48-56	Sandy loam, loamy sand, loamy coarse sand.	SM	A-2-4	0	100	100	65-95	13-30	---	NP
	56-99	Sandy clay loam, sandy loam, fine sandy loam.	SC, SM-SC, SM	A-4, A-2-4, A-2-6, A-6	0	100	100	69-95	25-50	18-23	4-12
5	0-56	Loamy sand	SM	A-2-4	0	100	100	85-100	13-25	---	NP
Blanton	56-70	Sandy clay loam, sandy loam, fine sandy loam.	SC, SM-SC, SM	A-4, A-2-4, A-2-6, A-6	0	100	100	69-95	25-50	18-23	4-12
6	0-7	Silt loam, fine sandy loam.	ML, CL, CL-ML	A-4, A-6	0	98-100	95-100	90-100	51-95	<40	NP-15
Cartecay	7-65	Loamy sand, fine sandy loam, loam, silt loam.	SM, SC, SM-SC	A-2, A-4	0	90-100	75-100	60-85	25-50	<30	NP-10
7	0-4	Sandy loam	SM, SM-SC	A-2, A-4	0	84-100	80-100	67-90	26-42	<30	NP-6
Cecil	4-60	Clay, sandy clay loam.	MH, ML	A-7, A-5	0	97-100	92-100	72-99	55-95	41-80	9-37
	60-70	Weathered bedrock	---	---	---	---	---	---	---	---	---
8	0-6	Sandy loam	SM, SM-SC	A-2, A-4	0	84-100	80-100	67-90	26-42	<30	NP-6
Cecil	6-60	Clay	MH, ML	A-7, A-5	0	97-100	92-100	72-99	55-95	41-80	9-37
	60-70	Weathered bedrock	---	---	---	---	---	---	---	---	---
9	0-7	Sandy loam	SM, SM-SC	A-2, A-4	0	84-100	80-100	67-90	26-42	<30	NP-6
Cecil	7-57	Clay	MH, ML	A-7, A-5	0	97-100	92-100	72-99	55-95	41-80	9-37
	57-70	Weathered bedrock	---	---	---	---	---	---	---	---	---
10	0-8	Cobbly loam	GM, GM-GC, SM, SM-SC	A-2, A-1	10-25	40-75	35-72	25-60	13-28	<22	NP-4
Cecil	8-48	Clay	MH, ML	A-7, A-5	0	97-100	92-100	72-99	55-95	41-80	9-37
	48-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
11	0-15	Loamy sand, sandy loam.	SM	A-2	0	90-100	85-100	50-80	13-30	---	NP
Cowarts	15-20	Fine sandy loam, sandy loam, sandy clay loam.	SM-SC, SC, SM	A-2, A-4, A-6	0	95-100	90-100	60-90	23-45	20-40	NP-15
	20-34	Sandy clay loam, sandy clay.	SM-SC, SM, SC	A-6, A-7	0	95-100	90-100	60-90	25-50	30-54	11-23
	34-80	Sandy loam, sandy clay loam, clay.	SM-SC, SC, CL-ML, CL	A-2, A-4, A-6, A-7	0	85-100	80-100	60-95	30-58	25-53	5-20

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
12----------	0-6	Loamy sand-------	SM	A-2	0	90-100	85-100	50-80	13-30	---	NP
Cowarts	6-37	Sandy clay loam, sandy clay.	SM-SC, SM, SC	A-6, A-7	0	95-100	90-100	60-90	25-50	30-54	11-23
	37-60	Sandy loam, sandy clay loam, clay.	SM-SC, SC, CL-ML, CL	A-2, A-4, A-6, A-7	0	85-100	80-100	60-95	30-58	25-53	5-20
13----------	0-9	Loamy sand-------	SM	A-2	0	90-100	85-100	50-80	13-30	---	NP
Cowarts	9-28	Sandy clay loam, sandy clay.	SM-SC, SM, SC	A-6, A-7	0	95-100	90-100	60-90	25-50	30-54	11-23
	28-60	Sandy loam, sandy clay loam.	SM-SC, SC, CL-ML, CL	A-2, A-4, A-6, A-7	0	85-100	80-100	60-95	30-58	25-53	5-20
14----------	0-10	Sandy loam-------	SM, SM-SC	A-2, A-4	0-3	95-100	95-100	50-85	18-40	<20	NP-7
Durham	10-59	Sandy clay loam, clay loam, sandy loam.	SC, CL	A-2, A-6, A-7	0	100	95-100	70-90	30-55	20-47	10-25
	59-85	Variable---------	---	---	---	---	---	---	---	---	---
15----------	0-9	Silt loam--------	CL, ML, CL-ML	A-4, A-6, A-7	0	98-100	95-100	90-100	60-85	20-50	4-20
Enoree	9-60	Clay loam, loam, silt loam.	CL, SM-SC, ML, CL-ML	A-4	0	95-100	90-100	50-95	36-85	<40	4-10
16----------	0-8	Sandy loam-------	SM, SC, SM-SC	A-2, A-4, A-6	0-3	95-100	85-100	65-90	30-50	<32	NP-15
Gwinnett	8-39	Clay, sandy clay	MH, ML, CL, CH	A-7, A-6	0-4	95-100	90-100	75-95	51-80	38-65	16-30
	39-50	Weathered bedrock	---	---	---	---	---	---	---	---	---
17----------	0-4	Sandy loam-------	SM, SC, SM-SC	A-2, A-4, A-6	0-3	95-100	85-100	65-90	30-50	<32	NP-15
Gwinnett	4-25	Clay, sandy clay	MH, ML, CL, CH	A-7, A-6	0-4	95-100	90-100	75-95	51-80	38-65	16-30
	25-40	Weathered bedrock	---	---	---	---	---	---	---	---	---
18----------	0-4	Sandy loam-------	SM, SC, SM-SC	A-2, A-4, A-6	0-3	95-100	85-100	65-90	30-50	<32	NP-15
Gwinnett	4-33	Clay, sandy clay	MH, ML, CL, CH	A-7, A-6	0-4	95-100	90-100	75-95	51-80	38-65	16-30
	33-50	Weathered bedrock	---	---	---	---	---	---	---	---	---
19----------	0-4	Sandy loam-------	SM, SM-SC	A-4, A-2	0-2	95-100	90-100	70-95	30-50	<35	NP-7
Hiwassee	4-48	Clay, silty clay, clay loam.	CL, ML, MH	A-7-5, A-7-6, A-6	0-2	95-100	95-100	80-100	70-95	36-52	12-20
	48-80	Weathered bedrock	---	---	---	---	---	---	---	---	---
20----------	0-8	Sandy loam-------	SM, SM-SC	A-4, A-2	0-2	95-100	90-100	70-95	30-50	<35	NP-7
Hiwassee	8-54	Clay, silty clay, clay loam.	CL, ML, MH	A-7-5, A-7-6, A-6	0-2	95-100	95-100	80-100	70-95	36-52	12-20
	54-80	Weathered bedrock	---	---	---	---	---	---	---	---	---
21----------	0-4	Silt loam--------	ML, CL, CL-ML	A-4	0	100	98-100	85-99	65-97	17-40	4-10
Kinston	4-47	Silt loam, clay loam, sandy clay loam.	CL	A-4, A-6, A-7	0	100	95-100	75-100	60-95	20-45	8-22
	47-55	Variable---------	---	---	0	---	---	---	---	---	---
22----------	0-8	Sandy loam-------	SM, SM-SC	A-2	0-15	80-100	75-95	50-80	25-35	<30	NP-6
Louisburg	8-31	Sandy loam-------	SM, SM-SC	A-2, A-4	0-15	85-100	75-98	53-78	25-40	<40	NP-7
	31-40	Weathered bedrock	---	---	---	---	---	---	---	---	---

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
23----------	0-8	Loamy sand-------	SM	A-2	0	98-100	95-100	70-100	15-35	<25	NP-4
Marlboro	8-53	Sandy clay, clay loam, clay.	CL, ML	A-4, A-6, A-7	0	98-100	95-100	78-100	51-70	25-48	8-20
	53-90	Sandy clay loam, sandy clay, clay.	CL, ML, SM, SC	A-4, A-6, A-7	0	98-100	95-100	74-100	45-70	24-48	8-20
24----------	0-15	Loamy sand, sandy loam.	SM	A-2, A-4	0	95-100	90-100	50-75	15-40	---	NP
Marvyn	15-30	Sandy clay loam, sandy loam.	ML, SC, SM, SM-SC	A-4, A-5	0	95-100	90-100	60-80	30-55	24-45	3-15
	30-53	Sandy clay loam, sandy clay.	ML, MH, SM	A-4, A-5, A-7	0	95-100	90-100	65-80	36-60	38-59	4-19
	53-72	Loamy sand, sandy loam, sandy clay loam.	SM, SC, ML, CL	A-1, A-2, A-4	0	95-100	90-100	45-85	20-55	<40	NP-10
25----------	0-9	Loamy sand-------	SM	A-2, A-4	0	95-100	90-100	50-75	15-40	---	NP
Marvyn	9-47	Sandy clay loam, sandy loam.	ML, SM, SC, SM-SC	A-4, A-5	0	95-100	90-100	60-80	30-55	24-45	3-15
	47-60	Loamy sand, sandy loam, sandy clay loam.	SM, SC, ML, CL	A-1, A-2, A-4	0	95-100	90-100	45-85	20-55	<40	NP-10
26:*											
Marvyn----------	0-15	Loamy sand-------	SM	A-2, A-4	0	95-100	90-100	50-75	15-40	---	NP
	15-30	Sandy clay loam, sandy loam.	ML, SC, SM, SM-SC	A-4, A-5	0	95-100	90-100	60-80	30-55	24-45	3-15
	30-53	Sandy clay loam, sandy clay.	ML, MH, SM	A-4, A-5, A-7	0	95-100	90-100	65-80	36-60	38-59	4-19
	53-72	Loamy sand, sandy loam, sandy clay loam.	SM, SC, ML, CL	A-1, A-2, A-4	0	95-100	90-100	45-85	20-55	<40	NP-10
Urban land.											
27----------	0-7	Silt loam--------	ML, SM	A-4, A-6, A-7-6	0-5	90-100	80-100	65-90	36-65	<45	NP-15
Mecklenburg	7-41	Silty clay, clay loam.	CH, MH	A-7	0-5	90-100	85-100	80-100	75-95	51-75	24-45
	41-45	Weathered bedrock	---	---	---	---	---	---	---	---	---
28----------	0-7	Loamy sand-------	SM	A-2	0	98-100	95-100	60-75	14-27	---	NP
Orangeburg	7-17	Sandy loam-------	SM	A-2	0	98-100	95-100	70-84	25-35	<30	NP-4
	17-30	Sandy clay loam	SC, CL	A-6, A-4	0	98-100	95-100	71-91	38-55	22-40	8-19
	30-70	Sandy clay loam, sandy clay.	SC, CL	A-6, A-4	0	98-100	95-100	70-97	40-65	25-40	8-21
29----------	0-6	Loamy sand-------	SM	A-2	0	98-100	95-100	60-75	14-27	---	NP
Orangeburg	6-19	Sandy loam-------	SM	A-2	0	98-100	95-100	70-84	25-35	<30	NP-4
	19-32	Sandy clay loam	SC, CL	A-6, A-4	0	98-100	95-100	71-91	38-55	22-40	8-19
	32-65	Sandy clay loam, sandy clay.	SC, CL	A-6, A-4	0	98-100	95-100	70-97	40-65	25-40	8-21
30*----------	0-10	Loamy sand-------	SM	A-2	0	98-100	95-100	60-75	14-27	---	NP
Orangeburg	10-60	Sandy clay loam	SC, CL	A-6, A-4	0	98-100	95-100	71-91	38-55	22-40	8-19
31----------	0-6	Sandy loam-------	SM, SM-SC	A-2	0-2	85-100	80-100	60-80	20-35	<36	NP-10
Pacolet	6-23	Clay loam, clay	ML, MH	A-6, A-7	0	80-100	80-100	60-95	51-75	38-65	11-30
	23-33	Sandy loam, sandy clay loam.	SC, CL	A-6, A-4	---	98-100	95-100	71-91	36-60	22-40	8-20
	33-40	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
32---------- Pacolet	0-3	Sandy loam-------	SM, SM-SC	A-2	0-2	85-100	80-100	60-80	20-35	<36	NP-10
	3-34	Sandy clay, clay loam, clay.	ML, MH	A-6, A-7	0	80-100	80-100	60-95	51-75	38-65	11-30
	34-40	Weathered bedrock	---	---	---	---	---	---	---	---	---
33---------- Pacolet	0-6	Sandy loam-------	SM, SM-SC	A-2	0-2	85-100	80-100	60-80	20-35	<36	NP-10
	6-29	Sandy clay, clay loam, clay.	ML, MH	A-6, A-7	0	80-100	80-100	60-95	51-75	38-65	11-30
	29-40	Weathered bedrock	---	---	---	---	---	---	---	---	---
34:*											
Pacolet---------	0-6	Sandy loam-------	SM, SM-SC	A-2	0-2	85-100	80-100	60-80	20-35	<36	NP-10
	6-33	Sandy clay, clay loam, clay.	ML, MH	A-6, A-7	0	80-100	80-100	60-95	51-75	38-65	11-30
	33-40	Weathered bedrock	---	---	---	---	---	---	---	---	---
Urban land.											
35. Pits											
36---------- Sacul	0-8	Loamy sand-------	SM, ML	A-4	0	95-100	90-100	80-100	40-65	<20	NP-3
	8-26	Clay, silty clay	CH, MH, CL	A-7	0	95-100	90-100	85-95	80-90	45-70	20-40
	26-60	Silty clay loam, silt loam, sandy clay loam.	CL, CH, ML, SC	A-6, A-7, A-4	0	95-100	90-100	85-100	40-90	25-55	8-32
37---------- Sacul	0-5	Loamy sand-------	SM, ML	A-4	0	95-100	90-100	80-100	40-65	<20	NP-3
	5-54	Clay, silty clay	CH, MH, CL	A-7	0	95-100	90-100	85-95	80-90	45-70	20-40
	54-65	Silty clay loam, silt loam, clay loam.	CL, CH, ML, SC	A-6, A-7, A-4	0	95-100	90-100	85-100	40-90	25-55	8-32
38---------- Sacul	0-8	Silt loam--------	SM, ML	A-4	0	95-100	90-100	80-100	40-65	<20	NP-3
	8-59	Clay, silty clay	CH, MH, CL	A-7	0	95-100	90-100	85-95	80-90	45-70	20-40
	59-85	Silty clay loam, silt loam, clay loam.	CL, CH, ML, SC	A-6, A-7, A-4	0	95-100	90-100	85-100	40-90	25-55	8-32
39---------- Toccoa	0-7	Sandy loam-------	SM, ML	A-2, A-4	0	98-100	95-100	85-100	25-60	<30	NP-4
	7-45	Sandy loam, loam	SM, ML	A-2, A-4	0	95-100	90-100	60-100	30-55	<30	NP-4
	45-60	Sandy clay loam, sandy loam, loam.	SM-SC, SC	A-2, A-4, A-6	0	95-100	90-100	60-80	30-55	20-40	6-20
40---------- Uchee	0-26	Loamy sand-------	SM	A-2, A-1-6	0	90-100	80-100	40-70	15-30	---	NP
	26-39	Sandy loam, sandy clay loam.	SC, SM-SC	A-2, A-4, A-6	0	90-100	80-100	50-80	25-50	20-40	6-20
	39-47	Sandy clay loam, sandy clay, clay.	MH, CH, CL, SC	A-6, A-7	0	90-100	80-100	65-90	40-70	40-70	18-38
	47-66	Sandy loam, sandy clay loam, sandy clay.	MH, CH, CL, SC	A-6, A-7	0	85-100	80-100	50-80	30-65	35-65	15-35
	66-84	Sandy loam, loamy sand.	SP-SM, SM, SM-SC	A-2	0	95-100	90-100	40-70	10-35	5-20	NP-7
41---------- Uchee	0-30	Loamy sand-------	SM	A-2, A-1-6	0	90-100	80-100	40-70	15-30	---	NP
	30-41	Sandy loam, sandy clay loam.	SC, SM-SC	A-2, A-4, A-6	0	90-100	80-100	50-80	25-50	20-40	6-20
	41-55	Sandy clay loam, sandy clay, clay.	MH, CH, CL, SC	A-6, A-7	0	90-100	80-100	65-90	40-70	40-70	18-38
	55-63	Sandy loam, sandy clay loam, sandy clay.	MH, CH, CL, SC	A-6, A-7	0	85-100	80-100	50-80	30-65	35-65	15-35

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
42---------- Uchee	0-33	Loamy sand-------	SM	A-2, A-1-6	0	90-100	80-100	40-70	15-30	---	NP
	33-40	Sandy loam, sandy clay loam.	SC, SM-SC	A-2, A-4, A-6	0	90-100	80-100	50-80	25-50	20-40	6-20
	40-48	Sandy clay loam, sandy clay, clay.	MH, CH, CL, SC	A-6, A-7	0	90-100	80-100	65-90	40-70	40-70	18-38
	48-65	Sandy loam, sandy clay loam, sandy clay.	MH, CH, CL, SC	A-6, A-7	0	85-100	80-100	50-80	30-65	35-65	15-35
43. Urban land											

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[The symbol < means less than. Entries under "Erosion factors--T" apply to the entire profile. Absence of an entry indicates that data were not available or were not estimated]

Map symbol and soil name	Depth	Clay <2mm	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
							K	T
	In	Pct	In/hr	In/in	pH			
2----------	0-8	8-20	2.0-6.0	0.10-0.15	4.5-5.5	Low----------	0.24	4
Appling	8-35	35-60	0.6-2.0	0.15-0.17	4.5-5.5	Low----------	0.20	
	35-54	15-40	0.6-2.0	0.12-0.16	4.5-5.5	Low----------	0.24	
	54-60	---	---	---	---	----------	----	
3----------	0-7	8-20	2.0-6.0	0.10-0.15	4.5-5.5	Low----------	0.24	4
Appling	7-29	35-60	0.6-2.0	0.15-0.17	4.5-5.5	Low----------	0.20	
	29-44	15-40	0.6-2.0	0.12-0.16	4.5-5.5	Low----------	0.24	
	44-60	---	---	---	---	----------	----	
4----------	0-48	5-13	6.0-20	0.05-0.10	4.5-6.0	Very low-----	0.17	5
Blanton	48-56	10-18	2.0-6.0	0.10-0.15	4.5-5.5	Low----------	0.24	
	56-99	12-30	0.6-2.0	0.10-0.15	4.5-5.5	Low----------	0.32	
5----------	0-56	5-13	6.0-20	0.05-0.10	4.5-6.0	Very low-----	0.17	5
Blanton	56-70	12-30	0.6-2.0	0.10-0.15	4.5-5.5	Low----------	0.32	
6----------	0-7	10-25	2.0-6.0	0.12-0.16	5.1-6.5	Low----------	0.32	5
Cartecay	7-65	7-18	2.0-6.0	0.09-0.12	5.1-6.5	Low----------	0.24	
7----------	0-4	5-20	2.0-6.0	0.12-0.14	4.5-6.0	Low----------	0.28	3
Cecil	4-60	40-60	0.6-2.0	0.13-0.15	4.5-5.5	Low----------	0.28	
	60-70	---	---	---	---	----------	----	
8----------	0-6	5-20	2.0-6.0	0.12-0.14	4.5-6.0	Low----------	0.28	3
Cecil	6-60	40-60	0.6-2.0	0.13-0.15	4.5-5.5	Low----------	0.28	
	60-70	---	---	---	---	----------	----	
9----------	0-7	5-20	2.0-6.0	0.12-0.14	4.5-6.0	Low----------	0.28	3
Cecil	7-57	40-60	0.6-2.0	0.13-0.15	4.5-5.5	Low----------	0.28	
	57-70	---	---	---	---	----------	----	
10----------	0-8	5-20	2.0-6.0	0.12-0.14	4.5-6.0	Low----------	0.24	4
Cecil	8-48	40-60	0.6-2.0	0.13-0.15	4.5-5.5	Low----------	0.28	
	48-60	---	---	---	---	----------	----	
11----------	0-15	3-10	2.0-6.0	0.06-0.10	4.5-5.5	Low----------	0.20	3
Cowarts	15-20	10-30	0.6-2.0	0.10-0.14	4.5-5.5	Low----------	0.28	
	20-34	25-40	0.2-2.0	0.10-0.16	4.5-5.5	Low----------	0.28	
	34-80	---	0.06-0.6	0.08-0.12	4.5-5.5	Low----------	0.24	
12----------	0-6	3-10	2.0-6.0	0.06-0.10	4.5-5.5	Low----------	0.20	3
Cowarts	6-37	25-40	0.2-2.0	0.10-0.16	4.5-5.5	Low----------	0.28	
	37-60	---	0.06-0.6	0.08-0.12	4.5-5.5	Low----------	0.24	
13----------	0-9	3-10	2.0-6.0	0.06-0.10	4.5-5.5	Low----------	0.20	3
Cowarts	9-28	25-40	0.2-2.0	0.10-0.16	4.5-5.5	Low----------	0.28	
	28-60	---	0.06-0.6	0.08-0.12	4.5-5.5	Low----------	0.24	
14----------	0-10	5-20	2.0-6.0	0.08-0.12	4.5-6.0	Low----------	0.17	4
Durham	10-59	18-35	0.6-2.0	0.12-0.16	4.5-5.5	Low----------	0.20	
	59-85	---	---	---	---	----------	----	
15----------	0-9	10-25	0.6-2.0	0.14-0.19	5.1-7.3	Low----------	0.20	4
Enoree	9-60	7-18	2.0-6.0	0.10-0.15	5.1-7.3	Low----------	0.20	
16----------	0-8	6-16	0.6-2.0	0.11-0.17	5.1-6.5	Low----------	0.28	4
Gwinnett	8-39	35-60	0.6-2.0	0.11-0.16	5.1-6.5	Low----------	0.28	
	39-50	---	---	---	---	----------	----	
17----------	0-4	6-16	0.6-2.0	0.11-0.17	5.1-6.5	Low----------	0.28	4
Gwinnett	4-25	35-60	0.6-2.0	0.11-0.16	5.1-6.5	Low----------	0.28	
	25-40	---	---	---	---	----------	----	

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay <2mm	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
							K	T
	In	Pct	In/hr	In/in	pH			
18----------	0-4	6-16	0.6-2.0	0.11-0.17	5.1-6.5	Low----------	0.28	4
Gwinnett	4-33	35-60	0.6-2.0	0.11-0.16	5.1-6.5	Low----------	0.28	
	33-50	---	---	---	---	----------	----	
19----------	0-4	6-16	0.6-2.0	0.10-0.14	4.5-6.5	Low----------	0.28	5
Hiwassee	4-48	35-60	0.6-2.0	0.12-0.15	4.5-6.5	Low----------	0.28	
	48-80	---	---	---	---	----------	----	
20----------	0-8	6-16	0.6-2.0	0.10-0.14	4.5-6.5	Low----------	0.28	5
Hiwassee	8-54	35-60	0.6-2.0	0.12-0.15	4.5-6.5	Low----------	0.28	
	54-80	---	---	---	---	----------	----	
21----------	0-4	5-15	0.6-2.0	0.14-0.20	4.5-6.0	Low----------	0.24	5
Kinston	4-47	18-35	0.6-2.0	0.14-0.18	4.5-5.5	Low----------	0.32	
	47-55	---	---	---	---	----------	----	
22----------	0-8	7-18	6.0-20	0.09-0.12	4.5-6.0	Very low-----	0.24	2
Louisburg	8-31	7-18	6.0-20	0.10-0.12	4.5-6.0	Very low-----	0.24	
	31-40	---	---	---	---	----------	----	
23----------	0-8	2-15	6.0-20	0.06-0.09	5.1-6.0	Low----------	0.20	4
Marlboro	8-53	35-50	0.6-2.0	0.14-0.18	5.1-6.5	Low----------	0.20	
	53-90	35-45	0.6-2.0	0.12-0.18	4.5-6.0	Low----------	0.20	
24----------	0-15	2-15	2.0-6.0	0.07-0.12	4.5-6.0	Low----------	0.24	3
Marvyn	15-30	18-35	0.6-2.0	0.12-0.17	4.5-5.5	Low----------	0.32	
	30-53	25-45	0.6-2.0	0.11-0.16	4.5-5.5	Low----------	0.32	
	53-72	10-30	0.2-2.0	0.07-0.14	4.5-5.5	Low----------	0.32	
25----------	0-9	2-15	2.0-6.0	0.07-0.12	4.5-6.0	Low----------	0.24	3
Marvyn	9-47	18-35	0.6-2.0	0.11-0.16	4.5-5.5	Low----------	0.32	
	47-60	10-30	0.2-2.0	0.07-0.14	4.5-5.5	Low----------	0.32	
26:*								
Marvyn----------	0-15	2-15	2.0-6.0	0.07-0.12	4.5-6.0	Low----------	0.24	3
	15-30	18-35	0.6-2.0	0.12-0.17	4.5-5.5	Low----------	0.32	
	30-53	25-45	0.6-2.0	0.11-0.16	4.5-5.5	Low----------	0.32	
	53-72	10-30	0.2-2.0	0.07-0.14	4.5-5.5	Low----------	0.32	
Urban land.								
27----------	0-7	8-25	0.6-2.0	0.14-0.19	5.6-7.3	Low----------	0.28	4
Mecklenburg	7-41	40-60	0.06-0.2	0.12-0.14	5.6-7.3	Moderate-----	0.32	
	41-45	---	---	---	---	----------	----	
28----------	0-7	4-12	2.0-6.0	0.06-0.08	4.5-6.0	Low----------	0.20	5
Orangeburg	7-17	10-20	2.0-6.0	0.07-0.10	4.5-5.5	Low----------	0.24	
	17-30	18-35	0.6-2.0	0.10-0.13	4.5-5.5	Low----------	0.24	
	30-70	25-45	0.6-2.0	0.10-0.13	4.5-5.5	Low----------	0.24	
29----------	0-6	4-12	2.0-6.0	0.06-0.08	4.5-6.0	Low----------	0.20	5
Orangeburg	6-19	10-20	2.0-6.0	0.07-0.10	4.5-5.5	Low----------	0.24	
	19-32	18-35	0.6-2.0	0.10-0.13	4.5-5.5	Low----------	0.24	
	32-65	25-45	0.6-2.0	0.10-0.13	4.5-5.5	Low----------	0.24	
30*----------	0-10	4-12	2.0-6.0	0.06-0.08	4.5-6.0	Low----------	0.20	5
Orangeburg	10-60	18-35	0.6-2.0	0.10-0.13	4.5-5.5	Low----------	0.24	
31----------	0-6	8-20	2.0-6.0	0.08-0.12	4.5-6.0	Low----------	0.28	3
Pacolet	6-33	35-60	0.6-2.0	0.12-0.15	4.5-6.0	Low----------	0.28	
	33-40	---	---	---	---	----------	----	
32----------	0-3	8-20	2.0-6.0	0.08-0.12	4.5-6.0	Low----------	0.28	3
Pacolet	3-34	35-60	0.6-2.0	0.12-0.15	4.5-6.0	Low----------	0.28	
	34-40	---	---	---	---	----------	----	
33----------	0-6	8-20	2.0-6.0	0.08-0.12	4.5-6.0	Low----------	0.28	3
Pacolet	6-29	35-60	0.6-2.0	0.12-0.15	4.5-6.0	Low----------	0.28	
	29-40	---	---	---	---	----------	----	

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay <2mm	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
							K	T
	In	Pct	In/hr	In/in	pH			
34:*								
Pacolet	0-6	8.20	2.0-6.0	0.08-0.12	4.5-6.0	Low	0.28	3
	6-33	35-60	0.6-2.0	0.12-0.15	4.5-6.0	Low	0.28	
	33-40	---	---	---	---		----	
Urban land.								
35.								
Pits								
36	0-8	4-12	0.6-2.0	0.10-0.20	4.5-5.5	Low	0.24	3
Sacul	8-45	35-60	0.06-0.2	0.12-0.18	4.5-5.5	High	0.32	
	45-60	10-40	0.2-0.6	0.16-0.24	4.5-5.5	Moderate	0.37	
37	0-5	4-12	0.6-2.0	0.10-0.20	4.5-5.5	Low	0.24	3
Sacul	5-54	35-60	0.06-0.2	0.12-0.18	4.5-5.5	High	0.32	
	54-65	10-40	0.2-0.6	0.16-0.24	4.5-5.5	Moderate	0.37	
38	0-8	4-12	0.6-2.0	0.10-0.20	4.5-5.5	Low	0.32	3
Sacul	8-59	35-60	0.06-0.2	0.12-0.18	4.5-5.5	High	0.32	
	59-85	10-40	0.2-0.6	0.16-0.24	4.5-5.5	Moderate	0.37	
39	0-7	4-20	2.0-6.0	0.09-0.12	5.1-6.5	Low	0.10	4
Toccoa	7-60	7-18	2.0-6.0	0.06-0.12	5.1-6.5	Low	0.10	
40	0-26	3-10	6.0-20	0.05-0.10	4.5-5.5	Low	0.15	5
Uchee	26-39	8-30	0.6-2.0	0.10-0.15	4.5-5.5	Low	0.24	
	39-47	25-50	0.2-0.6	0.10-0.16	4.5-5.5	Moderate	0.28	
	47-66	15-40	0.2-2.0	0.10-0.16	4.5-5.5	Moderate	0.28	
	66-84	5-15	0.6-6.0	0.06-0.12	4.5-5.5	Low	0.24	
41	0-30	3-10	6.0-20	0.05-0.10	4.5-5.5	Low	0.15	5
Uchee	30-41	8-30	0.6-2.0	0.10-0.15	4.5-5.5	Low	0.24	
	41-55	25-50	0.2-0.6	0.10-0.16	4.5-5.5	Moderate	0.28	
	55-63	15-40	0.2-2.0	0.10-0.16	4.5-5.5	Moderate	0.28	
42	0-33	3-10	6.0-20	0.05-0.10	4.5-5.5	Low	0.15	5
Uchee	33-40	8-30	0.6-2.0	0.10-0.15	4.5-5.5	Low	0.24	
	40-48	25-50	0.2-0.6	0.10-0.16	4.5-5.5	Moderate	0.28	
	48-65	15-40	0.2-2.0	0.10-0.16	4.5-5.5	Moderate	0.28	
43.								
Urban land								

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "frequent," "brief," "apparent," and "perched" are explained in the text. The symbol > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated]

Map symbol and soil name	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
2, 3---------- Appling	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
4, 5---------- Blanton	A	None--------	---	---	5.0-6.0	Perched	Jan-Apr	>60	---	High-----	High.
6---------- Cartecay	C	Occasional--	Brief-----	Dec-Mar	0.5-1.5	Apparent	Jan-Apr	>60	---	Low------	Moderate.
7, 8, 9, 10------- Cecil	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
11, 12, 13-------- Cowarts	C	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
14---------- Durham	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
15---------- Enoree	D	Frequent----	Brief-----	Jan-Dec	0-1.0	Apparent	Nov-Apr	>60	---	High-----	Moderate.
16, 17, 18-------- Gwinnett	B	None--------	---	---	>6.0	---	---	>60	---	High-----	Moderate.
19, 20---------- Hiwassee	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
21---------- Kinston	D	Frequent----	Brief-----	Nov-Jun	0-1.0	Apparent	Nov-Jun	>60	---	High-----	High.
22---------- Louisburg	B	None--------	---	---	>6.0	---	---	>48	Hard	Low------	Moderate.
23---------- Marlboro	B	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
24, 25---------- Marvyn	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	High.
26:* Marvyn---------- Urban land.	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	High.
27---------- Mecklenburg	C	None--------	---	---	>6.0	---	---	>48	Hard	High-----	Moderate.
28, 29, 30*------- Orangeburg	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
31, 32, 33-------- Pacolet	B	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
34:* Pacolet---------- Urban land.	B	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
35. Pits											
36, 37, 38-------- Sacul	C	None--------	---	---	>6.0	---	---	>60	---	High-----	Moderate.

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
39---------- Toccoa	B	Frequent----	Brief-----	Jan-Dec	2.5-5.0	Apparent	Dec-Apr	>60	---	Low------	Moderate.
40, 41, 42-------- Uchee	A	None--------	---	---	3.5-5.0	Perched	Jan-Apr	>60	---	Low------	High.
43. Urban land											

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 18.--ENGINEERING INDEX TEST DATA

[Absence of an entry indicates data were not available. NP means nonplastic]

Soil name, report number, horizon, and depth in inches	Classification		Grain-size distribution										Liquid limit	Plasticity index	Moisture density	
			Percentage passing sieve--							Percentage smaller than--					Max. dry density	Optimum moisture
	AASHTO	Unified	2 inch	3/4 inch	3/8 inch	No. 4	No. 10	No. 40	No. 200	.02 mm	.005 mm	.002 mm				
													Pct		Lb/Ft3	Pct
Blanton loamy sand:[1] (S74AL-081-006)																
A2--------9 to 32	A-2-4(00)	SM	100	100	100	97	94	55	19	--	--	--	--	NP	125	8
B2t------56 to 67	A-7-5(03)	SM	100	100	100	97	92	51	38	--	--	--	53	21	111	15
Cowarts loamy sand:[1] (S74AL-081-004)																
A2--------5 to 15	A-2-4(00)	SM	100	--	--	91	87	53	22	--	--	--	--	NP	129	9
B22t-----25 to 34	A-7-5(05)	SM	100	100	100	99	98	64	42	--	--	--	54	23	109	17
C2--------44 to 59	A-7-5(07)	SM	100	100	100	100	99	74	48	--	--	--	53	20	107	18
Marvyn loamy sand:[1] (S73AL-041-003)																
Ap--------0 to 7	A-2-4(00)	SM	100	100	100	99	96	62	16	--	--	--	--	NP	118	8
B22t-----30 to 44	A-7-5(07)	MH	100	100	100	98	96	73	57	--	--	--	54	12	96	23
IIc2-----60 to 72	A-1-B(00)	SM	100	100	100	99	95	48	21	--	--	--	38	6	114	13
Mecklenburg silt loam:[1] (S74AL-081-003)																
Ap--------0 to 7	A-4 (00)	ML	100	--	--	90	86	80	66	--	--	--	22	1	109	13
B21t------7 to 21	A-6 (14)	CL	100	100	100	99	98	96	87	--	--	--	38	16	101	21
C--------41 to 45	A-7-5(14)	ML	100	100	100	99	97	96	86	--	--	--	44	14	95	22
Pacolet sandy loam:[2] (S73AL-041-001)																
Ap--------0 to 6	A-2-4(00)	SM	100	100	100	93	88	68	24	--	--	--	--	NP	115	11
B2t-------6 to 28	A-7-5(09)	MH	100	100	100	99	98	89	68	--	--	--	51	12	95	25
C--------28 to 50	A-4 (00)	SM	100	100	100	99	98	76	39	--	--	--	--	NP	104	18
Pacolet sandy loam:[1] (S74AL-081-001)																
A---------0 to 6	A-4 (00)	SM	100	--	--	90	88	75	38	--	--	--	--	NP	105	15
B2t------11 to 23	A-7-6(07)	SM	100	--	--	90	89	78	50	--	--	--	48	19	103	19
C--------33 to 40	A-4 (00)	SM	100	100	100	100	100	86	39	--	--	--	35	4	108	16
Sacul silt loam:[3] (S73AL-041-004)																
A2--------2 to 8	A-4 (00)	ML	100	100	100	100	99	94	72	--	--	--	22	3	110	14
B21t------8 to 22	A-7-5(13)	ML	100	100	100	99	99	96	85	--	--	--	48	12	93	25
B24t-----35 to 53	A-7-5(21)	MH	100	100	100	100	100	99	85	--	--	--	60	19	83	34
IIc2-----65 to 80	A-4 (00)	ML	100	100	100	100	100	99	56	--	--	--	--	NP	90	26

See footnotes at end of table.

TABLE 18.--ENGINEERING INDEX TEST DATA--Continued

Map name, report number, horizon, and depth in inches	Classification		Grain-size distribution										Liquid limit	Plasticity index	Moisture density	
			Percentage passing sieve--							Percentage smaller than--						
	AASHTO	Unified	2 inch	3/4 inch	3/8 inch	No. 4	No. 10	No. 40	No. 200	.02 mm	.005 mm	.002 mm			Max. dry density	Optimum moisture
													Pct		Lb/Ft^3	Pct
Uchee loamy sand:[1] (S74AL-081-005)																
A2--------6 to 26	A-2-4(00)	SM	100	100	100	97	92	57	22	--	--	--	--	NP	129	8
C1--------47 to 66	A-7-5(14)	MH	100	--	--	89	84	71	61	--	--	--	63	23	98	21

[1]Refer to the section "Soil series and their morphology" for location of pedon.
[2]Pacolet sandy loam: 3.0 miles northeast of Opelika in the SW1/4SW1/4 sec. 34, T. 20 N., R. 27 E.
[3]Sacul silt loam: 2.3 miles southwest of Marvyn, 500 feet southeast of northwest corner of NE1/4SW1/4 sec. 36, T. 17 N., R. 26 E.

TABLE 19.--CHEMICAL ANALYSES OF SELECTED SOILS

Soil name and sample number	Depth	Horizon	Extractable bases (meg/100 g of soil)			Base saturation	Reaction (1:1 soil:water)
			Ca	Mg	K		
	In					Pct	pH
Appling							
S78AL-81-1-3	11-20	B21t	0.44	0.16	0.02	8.88	5.2
S78AL-81-1-4	20-35	B22t	0.26	0.26	0.02	6.47	5.5
Blanton							
S74AL-81-6-1	0-9	Ap	0.59	0.13	0.02	15.59	5.5
S74AL-81-6-2	9-32	A21	0.13	0.05	0.02	7.68	5.2
S74AL-81-6-3	32-48	A22	1.31	0.05	0.02	30.69	5.0
S74AL-81-6-4	48-56	B1	0.21	0.14	0.02	10.16	5.2
S74AL-81-6-5	56-67	B2t	0.19	0.10	0.03	9.91	5.1
S74AL-81-6-6	67-86	C1	0.15	0.02	0.02	2.91	5.1
S74AL-81-6-7	86-99	IIC2	0.11	0.02	0.01	2.80	5.0
Cecil							
S78AL-81-6-1	0-4	Ap	0.70	0.34	0.11	24.88	4.7
S78AL-81-6-2	4-7	B1	0.72	0.77	0.08	25.79	4.9
S78AL-81-6-3	7-26	B21t	0.40	0.73	0.05	14.73	5.4
S78AL-81-6-4	26-48	B22t	0.17	0.18	0.04	5.37	5.0
S78AL-81-6-5	48-60	B3	0.15	0.09	0.04	6.00	5.2
S78AL-81-6-6	60-70	C	0.12	0.04	0.01	7.69	4.9
Cowarts							
S74AL-81-4-1	0-5	Ap	1.68	0.42	0.06	43.10	6.0
S74AL-81-4-2	5-15	A2	0.39	0.26	0.08	24.85	5.9
S74AL-81-4-3	15-20	B1	0.25	0.13	0.03	9.67	4.9
S74AL-81-4-4	20-25	B21t	0.54	0.13	0.02	2.54	5.1
S74AL-81-4-5	25-34	B22t	0.27	0.14	0.02	9.68	5.1
S74AL-81-4-6	34-44	C1	0.35	0.13	0.02	9.48	4.9
S74AL-81-4-7	44-59	C2	0.17	0.04	0.02	4.88	4.9
S74AL-81-4-8	59-80	IIC3	0.07	0.01	0.01	2.72	4.8
Hiwassee							
S73AL-41-2-1	0-4	Ap	4.00	0.40	0.04	60.70	5.1
S73AL-41-2-2	4-26	B21t	2.28	0.47	0.07	44.10	5.6
S73AL-41-2-3	26-48	B22t	0.36	0.28	0.05	14.90	5.2
S73AL-41-2-4	48-80	C	0.06	0.06	0.11	4.80	5.2
Marlboro							
S74AL-81-8-1	0-8	Ap	0.51	0.11	0.05	31.09	5.4
S74AL-81-8-2	8-13	B1	0.49	0.14	0.05	52.04	5.5
S74AL-81-8-3	13-28	B21t	1.79	0.59	0.06	40.05	5.2
S74AL-81-8-4	28-53	B22t	1.35	0.53	0.03	26.93	4.8
S74AL-81-8-5	53-85	B23t	0.43	0.15	0.06	8.22	4.8
S74AL-81-8-6	85-90	C	0.11	0.06	0.02	5.82	5.0
Marvyn							
S73AL-41-3-1	0-7	Ap	0.71	0.10	0.02	18.92	5.8
S73AL-41-3-2	7-15	B1	0.57	0.24	0.06	16.21	5.5
S73AL-41-3-3	15-30	B21t	0.87	0.31	0.07	31.02	5.3
S73AL-41-3-4	30-44	B22t	1.15	0.45	0.06	26.10	5.2
S73AL-41-3-5	44-53	B3	0.23	0.17	0.02	7.72	4.7
S73AL-41-3-7	60-72	IIC2	0.17	0.06	0.01	8.30	4.7
Mecklenburg							
S74AL-81-3-1	0-7	Ap	0.78	0.34	0.04	28.16	5.7
S74AL-81-3-2	7-21	B21t	1.61	1.94	0.05	41.66	5.5
S74AL-81-3-3	21-29	B22t	1.34	2.42	0.05	50-81	6.4
S74AL-81-3-4	29-41	B3	1.08	2.48	0.09	55.19	6.7
S74AL-81-3-5	41-45	C	0.68	2.57	0.12	59.26	7.0

TABLE 19.--CHEMICAL ANALYSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Extractable bases (meg/100 g of soil)			Base saturation	Reaction (1:1 soil:water)
			Ca	Mg	K		
	In					Pct	pH
Orangeburg							
S74AL-81-7-1	0-7	Ap	0.61	0.04	0.07	16.99	4.9
S74AL-81-7-2	7-17	B1	1.21	0.12	0.10	31.50	4.9
S74AL-81-7-3	17-30	B21t	1.23	0.18	0.04	26.38	5.1
S74AL-81-7-4	30-70	B22t	1.13	0.34	0.03	32.01	5.1
Pacolet							
S74AL-81-1-1	0-6	A1	0.77	0.34	0.13	22.08	5.0
S74AL-81-1-2	6-11	B1	0.75	0.40	0.08	24.74	5.0
S74AL-81-1-3	11-23	B2t	1.21	0.43	0.08	30.15	5.5
S74AL-81-1-4	23-33	B3	0.41	0.19	0.05	14.54	5.4
S74AL-81-1-5	33-40	C	0.28	0.16	0.03	14.22	5.2
Uchee							
S74AL-81-5-1	0-6	Ap	0.37	0.03	0.06	22.64	5.2
S74AL-81-5-2	6-26	A2	0.13	0.01	0.03	14.26	4.9
S74AL-81-5-3	26-32	B1	0.25	0.03	0.03	11.85	4.8
S74AL-81-5-4	32-39	B21t	0.47	0.05	0.05	15.53	4.9
S74AL-81-5-5	39-47	B22t	0.89	0.17	0.06	16.83	5.0
S74AL-81-5-6	47-66	C1	0.33	0.08	0.03	7.40	4.8
S74AL-81-5-7	66-84	IIC2	0.14	0.04	0.02	3.53	4.7

TABLE 20.--PHYSICAL ANALYSES OF SELECTED SOILS

Soil name and sample number	Depth	Horizon	Particle-size distribution (Percent less than 2.00 mm)		
			Sand (2.0-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)
	In				
Appling					
S78AL-81-1-3----	11-20	B21t	28.5	29.3	42.2
S78AL-81-1-4----	20-35	B22t	16.0	26.4	57.6
Blanton					
S74AL-81-6-1----	0-9	Ap	79.5	17.1	3.4
S74AL-81-6-2----	9-32	A21	80.6	17.5	1.9
S74AL-81-6-3----	32-48	A22	83.4	11.8	4.8
S74AL-81-6-4----	48-56	B1	75.9	15.9	8.2
S74AL-81-6-5----	56-67	B2t	62.8	14.9	22.3
S74AL-81-6-6----	67-86	C1	46.7	9.5	43.8
S74AL-81-6-7----	86-99	IIC2	65.8	13.0	21.2
Cecil					
S78AL-81-6-1----	0-4	Ap	59.8	21.3	18.9
S78AL-81-6-2----	4-7	B1	41.7	18.1	40.2
S78AL-81-6-3----	7-26	B21t	26.7	16.1	57.4
S78AL-81-6-4----	26-48	B22t	31.9	25.9	42.2
S78AL-81-6-5----	48-60	B3	48.5	25.4	26.1
S78AL-81-6-6----	60-70	C	65.4	20.4	14.2
Cowarts					
S74AL-81-4-1----	0-5	Ap	80.6	15.4	4.0
S74AL-81-4-2----	5-15	A2	73.2	20.3	6.5
S74AL-81-4-3----	15-20	B1	67.6	14.8	17.6
S74AL-81-4-4----	20-25	B21t	60.1	13.5	26.4
S74AL-81-4-5----	25-34	B22t	50.0	9.9	31.1
S74AL-81-4-6----	34-44	C1	43.4	7.3	39.3
S74AL-81-4-7----	44-59	C2	55.7	12.7	31.7
S74AL-81-4-8----	59-80	IIC3	75.6	14.3	10.1
Hiwassee					
S73AL-41-2-1----	0-4	Ap	76.4	14.4	9.2
S73AL-41-2-2----	4-26	B21t	35.9	18.1	46.0
S73AL-41-2-3----	26-48	B22t	42.0	25.0	33.0
S73AL-41-2-4----	48-80	C	46.5	27.0	26.5
Marlboro					
S74AL-81-8-1----	0-8	Ap	76.7	18.0	5.3
S74AL-81-8-2----	8-13	B1	72.3	22.9	4.8
S74AL-81-8-3----	13-28	B21t	42.4	17.3	40.3
S74AL-81-8-4----	28-53	B22t	33.4	16.0	50.6
S74AL-81-8-5----	53-85	B23t	33.6	13.7	52.7
S74AL-81-8-6----	85-90	C	60.1	14.3	25.6
Marvyn					
S73AL-41-3-1----	0-7	Ap	81.6	16.0	2.4
S73AL-41-3-2----	7-15	B1	67.7	20.3	12.0
S73AL-41-3-3----	15-30	B21t	63.7	18.0	18.3
S73AL-41-3-4----	30-44	B22t	45.4	11.3	43.2
S73AL-41-3-5----	44-53	B3	48.8	8.4	42.8
S73AL-41-3-7----	60-72	IIC2	78.9	8.9	12.2
Mecklenburg					
S74AL-81-3-1----	0-7	Ap	24.2	66.6	9.2
S74AL-81-3-2----	7-21	B21t	9.0	46.4	44.6
S74AL-81-3-3----	21-29	B22t	10.5	46.7	42.8
S74AL-81-3-4----	29-41	B3	17.2	44.8	38.0
S74AL-81-3-5----	41-45	C	15.5	50.1	34.4
Orangeburg					
S74AL-81-7-1----	0-7	Ap	77.5	16.5	6.0
S74AL-81-7-2----	7-17	B1	66.2	17.8	16.0
S74AL-81-7-3----	17-30	B21t	56.2	10.2	33.6
S74AL-81-7-4----	30-70	B22t	49.8	11.1	39.1

TABLE 20.--PHYSICAL ANALYSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Particle-size distribution (Percent less than 2.00 mm)		
			Sand (2.0-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)
	In				
Pacolet					
S74AL-81-1-1----	0-6	A1	59.1	25.2	15.7
S74AL-81-1-2----	6-11	B1	45.4	19.2	35.4
S74AL-81-1-3----	11-23	B2t	41.5	15.3	43.2
S74AL-81-1-4----	23-33	B3	51.5	16.8	31.7
S74AL-81-1-5----	33-40	C	67.1	13.9	19.0
Uchee					
S74AL-81-5-1----	0-6	Ap	79.7	16.3	4.0
S74AL-81-5-2----	6-26	A2	76.3	18.7	5.1
S74AL-81-5-3----	26-32	B1	74.0	17.8	8.2
S74AL-81-5-4----	32-39	B21t	60.9	18.1	21.0
S74AL-81-5-5----	39-47	B22t	35.0	16.4	48.6
S74AL-81-5-6----	47-66	C1	61.3	17.3	21.5
S74AL-81-5-7----	66-84	IIC2	80.3	13.7	6.0

TABLE 21.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Appling	Clayey, kaolinitic, thermic Typic Hapludults
*Blanton	Loamy, siliceous, thermic Grossarenic Paleudults
Cartecay	Coarse-loamy, mixed, nonacid, thermic Aquic Udifluvents
Cecil	Clayey, kaolinitic, thermic Typic Hapludults
Cowarts	Fine-loamy, siliceous, thermic Typic Hapludults
Durham	Fine-loamy, siliceous, thermic Typic Hapludults
Enoree	Coarse-loamy, mixed, nonacid, thermic Aeric Fluvaquents
Gwinnett	Clayey, kaolinitic, thermic Typic Rhodudults
Hiwassee	Clayey, kaolinitic, thermic Typic Rhodudults
Kinston	Fine-loamy, siliceous, acid, thermic Typic Fluvaquents
Louisburg	Coarse-loamy, mixed, thermic Ruptic-Ultic Dystrochrepts
Marlboro	Clayey, kaolinitic, thermic Typic Paleudults
Marvyn	Fine-loamy, siliceous, thermic Typic Hapludults
*Mecklenburg	Fine, mixed, thermic Ultic Hapludalfs
Orangeburg	Fine-loamy, siliceous, thermic Typic Paleudults
Pacolet	Clayey, kaolinitic, thermic Typic Hapludults
Sacul	Clayey, mixed, thermic Aquic Hapludults
Toccoa	Coarse-loamy, mixed, nonacid, thermic Typic Udifluvents
Uchee	Loamy, siliceous, thermic Arenic Hapludults

* The soil is a taxadjunct to the series. See text for a description of those characteristics of the soils that are outside the range of the series.

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